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The Proper Care of Trees Is a Good Investment

John Davey
The Father of Tree Surgery

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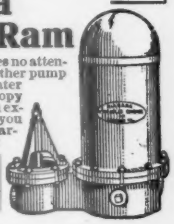

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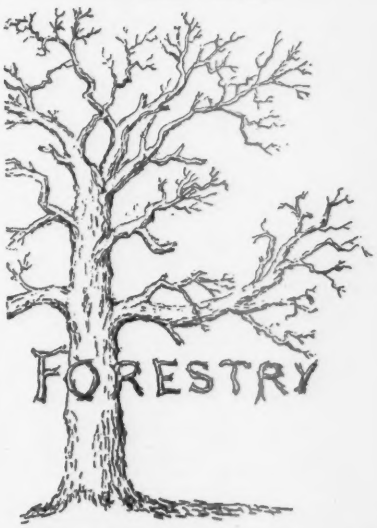

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The object of the Association is to promote the preservation, by wise use, and the extension of the forests of the United States; its means are agitation and education; it seeks to encourage the application of forestry by private owners to forest holdings, large or small; and it favors, especially, the establishment and multiplication of National and State forests, to be administered in the highest interests of all.

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CONSERVATION

OFFICIAL MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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Irrigation in Eastern Washington: a Five-year-old Wagener Apple Tree Bearing Eight Boxes

Vol. XV JUNE, 1909 No. 6

THE PATHFINDER DAM

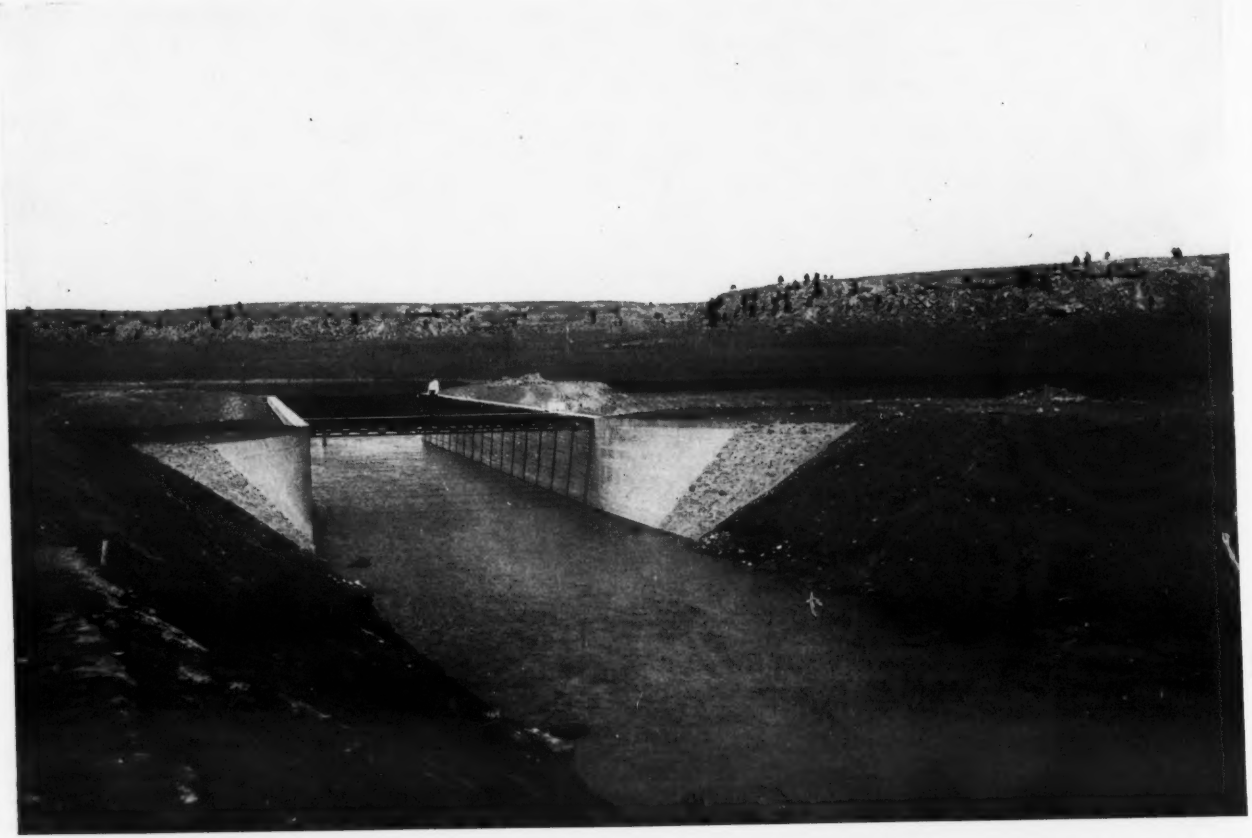
By C. J. BLANCHARD, Statistician, U. S. Reclamation Service

THE completion of the Pathfinder dam, one of the highest structures of its kind in the world, is the event which the people of Wyoming and Nebraska are now celebrating. Resting on a bed of solid granite, and hewn from the vertical walls of the same formation through which the North Platte River has cut its channel, a massive masonry monolith closes the canyon. It rises 215 feet above its foundation, and is 500 feet long on top. But the real significance of the event is that it marks the most important step in the reclamation of large tracts of the Great Plains area in both states, and their transformation to thickly settled farming communities, with numerous populous and prosperous towns and villages.

The North Platte River drains an area of 90,000 square miles, carrying the run-off of a large mountainous territory. Fed by the melting snows of spring and early summer its volume swells to large proportions, but in the late summer it shrinks to a small stream, distributed over a wide stretch of shifting sands. Every drop of the low water flow has long been appropriated, and the conservation of the flood waters of the river was beyond the reach of private capital. It was for the purpose of storing the flood and winter waters and controlling the flow of this irregular river that the great dam just completed was planned.

Behind the massive wall of masonry a million acre-feet of water will be stored each year, and the destructive floods of the North Platte River, which annually have caused damages far in excess of the cost of the dam, will never again visit the valley. The name of the structure is most appropriate, in that it makes of the dam a fitting monument to commemorate forever the achievement of the Nation's daring pioneer and explorer, Capt. John C. Fremont, "The Pathfinder."

The North Platte Irrigation Project is one of the largest so far undertaken by the Government. From the Pathfinder dam at a point on the North Platte River about fifty miles southwest from Casper, Wyo., to the farthest lim-



North Platte Project, Nebraska. Spring Canyon Flume, Inside View, Interstate Canal

W. J. LUBKEN, AUG. 29, 1907

its of the irrigable land in Nebraska, the distance is fifty miles, and it is estimated that 400,000 acres of land in Wyoming and Nebraska, or more than double the total area of land cultivated in the entire state of Rhode Island, will be divided into small farms and irrigated.

The comparison afforded by the following table, showing the dimensions, cost and effectiveness of the Pathfinder and three large eastern dams, is most interesting:

Dam	Height in ft.	Length in ft.	Contents in cu. yds.	Cost	Storage capacity acre-feet
Pathfinder..	215	500	60,400	$1,200,000	1,025,000
Wachusett.	228	971	273,000	2,226,000	192,000
New Croton	297	1,072	833,000	7,631,000	92,000
Ashokan...	220	[1]4,800	[2]7,900,000	12,700,000	368,000

[1]Masonry, 1,000 feet, and earthwork, 3,800 feet.
[2]900,000 cubic yards masonry and 7,000,000 of earth.

It will be seen that the Pathfinder dam, which cost only $1,200,000, has a storage capacity more than ten times that of the New Croton which cost six times as much.

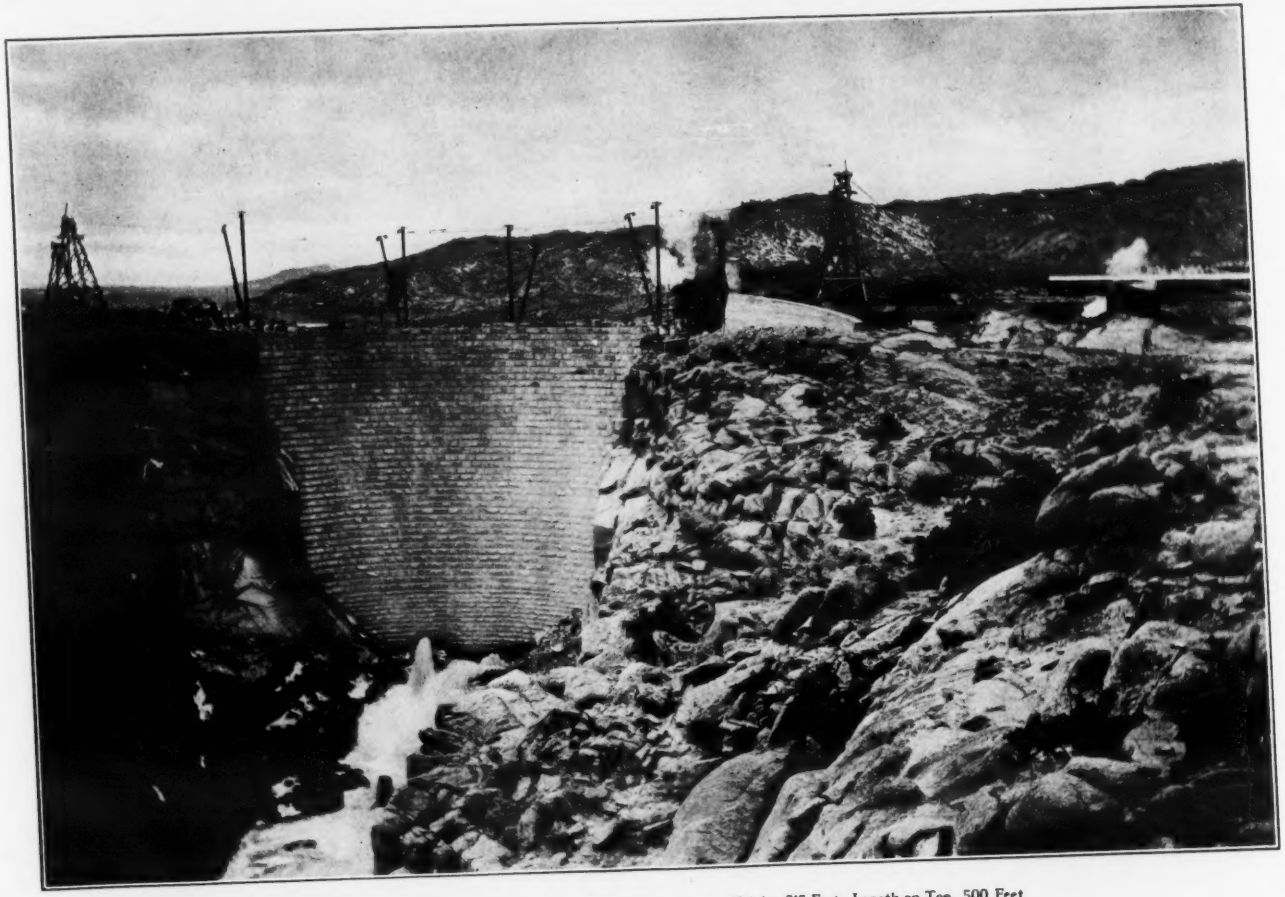
One hundred miles from the storage dam a low diversion dam has been thrown across the river, which turns the waters into the Interstate Canal, to supply lands in Wyoming and Nebraska. This canal when completed will be 150 miles long, but at present only ninety-five miles have been excavated. It has a capacity at the headgates of 1,400 second-feet. Hundreds of miles of laterals have been constructed to distribute the water over the lands.

One of the most attractive features of the valley is its sunny, invigorating climate. The summers are always comfortable and the winters are relatively mild. The general elevation is about 4,000 feet above sea level. The soil is a rich, sandy loam, with a crop-producing capacity that to the farmer of the humid region seems incredible. Oats yielding 120 bushels per acre and weighing forty-five pounds to the bushel have been grown, and the average yield for the valley probably will exceed sixty-five bushels. Three crops of alfalfa are cut during the year, often yielding five tons to the acre, and fifty bushels of corn per acre is a low yield. The region is particularly adapted to the culture of sugar beets. As high as twenty-eight tons per acre have been produced with a sugar content of fifteen per cent. Apples, plums, small fruit and berries are grown for home consumption. Vegetables bring good prices, and the potatoes especially are of superior quality.

Hog and poultry raising and bee culture have proved very profitable. Back of the valley and extending for hundreds of miles is the vast public range, upon which graze many thousands of cattle and sheep. There is a heavy demand for forage crops for winter feeding, and a large part of the irrigable lands will be profitably devoted to these crops for many years.

Under the terms of the Reclamation Act all of the land under this project which belongs to the public domain is open to entry under the homestead law in farms of about eighty acres. Each settler is required to pay his share of the cost of building the irrigation works. This amounts to $45 per acre, payable in ten annual installments without interest.

Among all the great irrigation works now under construction by the Government, none is richer in historical associations than the North Platte project. It occupies more than 250 miles of the old overland trail which was followed by the California gold seekers and by the Mormons in their migration westward. The old highway is distinguishable in scores of places. With an average width of more than 100 feet it stretches on, mile after mile, now overgrown and distinguishable from the general surroundings only by the difference in vegetation. Its great width is principally due to the fact that the Mormons traveled in great companies, their wagons often moving in a solid phalanx five or more abreast. Beside the trail at numerous points lonely headstones mark the graves of those who perished on that western journey. To those who have read "The Adventures of Captain Bonneville," "Astoria,"



Pathfinder Dam. Nearly Completed. March 21, 1909. Dimensions: Height, 215 Feet; Length on Top, 500 Feet

North Platte Dam Site, from Point Just below Line of Dam Site, Showing Location of Dam Site between Granite Walls. North Platte Project, Nebraska W. J. LUBKEN, SEPT. 25, 190/

the discoveries of Captain Fremont, histories of Mormon emigration and of the Forty-niners, such fiction as "The Virginian," and the adventures of Buffalo Bill, this valley will be familiar and full of interesting associations. But the greatest change in all the history of the valley has been brought about by the construction of the great irrigation system, now well on its way to completion. Already the dreary monotony of plain and sky has been broken, and thousands of homes and fields of green dot the landscape. Lands which a few years ago were valued at from $1 to $5 per acre are increasing rapidly in value and now sell readily at from $20 to $50. Most of the land for which water is now available is in private ownership, but many of the farmers who have holdings in excess of that for which the Government will furnish a water right must dispose of part of their land at reasonable prices.

To subdue the land one has but to turn the sod. The soil is fertile, the water supply practically unlimited, and the climate delightful. All these combine to make the life of the new comer a pleasant one. A railroad extends the entire length of the project, and the numerous towns along this line have more than doubled in population since the initiation of the Government irrigation project. The influx of thousands of farmers to the valley has created a demand for all classes of labor. Mechanics are scarce, carpenters in demand, and brick masons, plasterers, plumbers, blacksmiths, and in fact all men with trades, will find good openings in these rapidly growing communities. The manufacturer, the banker, and the merchant are also in demand.

That these opportunities are not being overlooked is evidenced by the hundreds of letters of inquiry which are being received by the statistician of the Reclamation Service at Washington. To meet the demands of the homeseekers requiring information the Reclamation Service has also established offices at Denver, Colo., and at Chicago, Ill. To a farmer who is looking for a good location this section offers an excellent opportunity.

North Platte Project, Nebraska. Growing Sugar Cane on the Dutch Flats, Interstate Canal

W. J. LUBKEN, AUG. 30, 1907

Irrigation in Eastern Washington, Showing What Can Be Raised between Trees

WATER CIRCULATION AND ITS CONTROL

By BAILEY WILLIS, E.M.C.E., United States Geological Survey

(*Continued*)

Outline of Methods of Control

ENGINEERING CONTROL OF SURFACE FLOW

THE engineer aims to regulate surface flow through methods of storage, diversion, or confinement in an established channel. His selection of method is determined by the topographic conditions of the particular locality primarily, and also by the balancing conditions of need and cost. The result is a reservoir, canal, or other structure designed to be permanent, to meet the greatest emergency which may arise, and to supply such water or afford such relief from water as conditions require. When practicable the investment should return to the people at least a fair interest on the cost. These limiting conditions are so well understood and engineering practise is based upon such a thorough knowledge of fundamental mechanical principles that in any given case the engineer's calculation may be implicitly trusted, provided that the factors of run-off, fluctuation, and sediment, which are fundamental elements of the problem, do not at any future time exceed the maximum limits which past experience leads him to assume. This provision implies that the progress of settlement and the exploitation of our natural resources should not unfavorably modify the relation of run-off to ground storage and evaporation. Through ignorance, carelessness, and greed, the farmer, herdsman, and lumberman are constantly violating this provision, as we shall see when we come to the consideration of the specific relation of their activities to the partition and distribution of precipitation. The engineer is now called upon to regulate run-off, the irregularity of which is persistently aggravated by these widespread activities; he is required to take care of sediment whose volume is constantly increased by vicious methods of agriculture, grazing, and deforestation, and the Nation collectively spends millions on engineering while the people individually render the expenditure useless.

The engineer urgently needs the support of an educated, enlightened public opinion which will control individuals. In proportion as every landowner manages his property intelligently with regard to its perpetual value and the welfare of the commonwealth, the engineer's problem will shrink within those limits of reasonable magnitude and cost which it now threatens to exceed.

Let us consider some of the examples of the engineer's methods of regulating surface flow by storage, drainage, diversion, and canalization.

The construction of reservoirs for the storage of waters is, in comparison with its possibilities, very slightly developed in the United States. A few examples will illustrate the magnitude and purposes of existing works.

The Croton reservoir system cost Greater New York $86,359,562 up to 1898; and estimates on extensions and improvements are $161,000,000. The city can afford it, for the system supplies pure water to 4,000,000 persons, among whom, considering one benefit only, the death rate from typhoid fever was, in 1905, sixteen per 100,000, as against more than 100 per 100,000 in certain cities supplied with polluted river water.

On the upper Mississippi a reservoir system has been gradually installed

Upper Dam on Otay Creek, near San Diego, Cal., Looking across the Canyon. This and the Sweetwater and Bear Valley Dams, All in Southern California, Are Curved with Arch Upstream

Minidoka Reservoir Site, Idaho

since 1880 to control high and low stages of the river for navigation. Lake levels were raised and low, flat lands were flooded. The topographic conditions were favorable and the cost for lands and improvements submerged was low. In sixteen years the Federal Government expended $1,525,000.[1]

Storage reservoirs for irrigation waters were established in the arid West by private enterprise in the early settlement of the regions, but work on a large scale began after the passage of the reclamation act, in 1902. The Reclamation Service has twenty-eight projects in various stages of progress. They will make available for homes 1,910,000 acres, at a cost of $70,000,000, or $36.65 per acre.[2]

In any particular case the cost per acre-foot of storage capacity depends chiefly on the topographic situation, which determines the magnitude and character of the structures, and on the value of property to be displaced or submerged. In general, it costs less per acre-foot to store a large body of water than a smaller one.

The efficiency of a reservoir may be said to be its capacity to retain the water which ought to be stored. If it will hold all the surface flow of its drainage basin, less the amount used and evaporated during any time, its efficiency is 100 per cent. In proportion as it fails to do this during floods its efficiency falls below the maximum. A reservoir which will have an efficiency of 100 per cent is being built by the Reclamation Service on the Rio Grande above El Paso. It will retain more than the entire annual precipitation, approximately three times the surface flow of the drainage basin, and when it is completed floods which have been disastrous will be absolutely abolished.

If other conditions are alike, the efficiency depends on the amount and distribution of the waters from rain and snow melting. These vary according to broad districts. The factor which primarily determines cost, namely, the character of topographic basins which may be dammed, also varies broadly, and according to the distribution of these two factors we may distinguish at least four regions which are unlike in regard to storage possibilities.

The arid plains and basins of the West afford conditions of minimum or moderate cost and maximum efficiency for reservoir storage. The experience of the Reclamation Service has been cited.

Another region where reservoirs of moderate cost and adequate efficiency are possible is that of lakes and swamps which lie within the area covered in a recent geologic epoch by the great ice sheet. It includes parts of the Dakotas, Minnesota, Wisconsin, Illinois, Indiana, Michigan, and, in a less degree, New York and New England. In this region there are thousands of lakes, each one of which is a natural reservoir, and many more swamps, each one of which is a shallow but practicable reservoir site. The experience with the Government dams on the upper Mississippi gives the best insight into the value of these reservoir conditions.

A third district which may be distinguished with reference to the possibilities of reservoir storage is found in the prairie states—Iowa, Illinois, and Ohio—and in areas of similar topography, population, and precipitation. In that part of those states which lies outside of the old ice limit, streams as a rule run in ravines or narrow valleys, which, however, have moderate fall and would, in many localities, afford practicable conditions for reservoir storage. The cost of farm lands and town sites which must be submerged is such, however, as to render capacious reservoirs too costly, provided any other means of control be practicable. Here the question of cost will limit the construction of large reservoirs. The lands are farmed and upon the farmer must rest the responsibility to the Nation for a proper regulation of the water flow.

[1] Annual Report, Chief of Engineers, U. S. Army, part 2, p. 1439, 1906.
[2] Blanchard, C. J.: Home-making by the Government. Nat. Geogr. Mag., April, 1908.

The Flood in Salt River Valley, Ariz. View Looking Toward Tempe Butte from the North End of the Southern Pacific Railroad Bridge, Showing Flooded Farms on the North Side of Salt River; also Santa Fe's Wrecked Bridge, Caused by Flood on the Night of April 12, 1905

Redwood Stave Pipe (52 Inches in Diameter) Crossing Warmsprings Canyon near Redlands, Cal.

The topographic character of the region is favorable to the construction of large numbers of small reservoirs to catch the flood run-off from near-by fields, and this item in farm equipment should become as much a matter of public interest and control as the maintenance of public roads. But the silt from badly tilled fields will render reservoirs useless unless the farmer prevents erosion. The larger factor in control must be found in improved methods of tillage and crop rotation.

A fourth district which presents special conditions in regard to storage is that of the Appalachian Mountain region. Here topographic forms are such as to render reservoir construction both difficult and expensive. The narrow valleys alone offer possible sites. Their steep gradients necessitate high dams for reservoirs of moderate capacity. Where wide bottom lands afford better opportunities important towns are commonly located. Moreover the efficiency of such reservoirs must be low, because the flood run-off is torrential and some considerable part of it must be permitted to escape. We may not, however, conclude that reservoirs are impracticable.

The Appalachian Mountains have always had and will always have special relations to national development. Their mountain wall guarded the colonies during a century of French and Indian warfare. Eventually occupied by American enterprise, the region became through its resources in minerals, lumber, and water power a dominant source of national strength and wealth. It can never support a large agricultural population, yet the mountain dwellers will cultivate their fields in its upland valleys so long as the soil remains. Its mineral wealth will certainly be exhausted, but its forests and streams, those two intimately related and most valuable factors in the Nation's prosperity, need never be impaired though continually used.

These mountains possess a power to do harm which is not less than their power to confer benefit. The floods that gather from their rills traverse the richest cities, manufacturing districts, and valleys, and exact annually an enormous tribute. The cost in dead loss, in lessened values, and crippled industries will eventually force the Nation to protect itself. There are men—engineers, too—who believe they can fetter the full-grown flood, but the commonwealth which trusts to them alone and neglects the agencies of forestry and agriculture that divert the raindrops will suffer till it has bought wisdom dearly.

Thus throughout this mountain region the problem of controlling surface waters is not only particularly difficult, but its solution is peculiarly important. The engineer has here a grave and difficult task to perform, and even under the unfavorable local conditions the storage reservoir must take its place as one of the features of the system of regulation.

In our general discussion drainage is next. It stands in direct contrast to storage. It promotes quick discharge, increases flood run-off, and dries up swamps that storage would convert into reservoirs. No region from which injurious floods gather should be drained, for the drainage system will increase the floods. On the upper Mississippi, for instance, we would not drain the reservoirs produced by artificial dams, nor should we drain swamps that empty into them or into the river below them without duly considering to what extent our left hand is undoing the work that our right hand has done.

Yet drainage has its place in the national management of surface waters. It is appropriate in lands liable to overflow and which may safely be permitted to return the waters promptly to the stream as the river falls. It is permissible in lands whose value when drained exceeds the value of lands that the drainage waters may submerge. Here, as indeed generally, throughout this whole question of conservation the resulting value determines whether or no the thing should be done.

Diversion canals are designed to take a part or all the water of any system and conduct it from the channel in

The Gorge of the Linville River across the Blue Ridge. On These Steep, Rocky Walls Are Forests Which Should Be Preserved Forever

Mixed Hardwood and Pine Forest on Oconalufty River, Swain County, North Carolina. On the lower mountain slopes and ridges the pines are often mixed with the hardwoods. But whatever the nature of the trees, the frequent fires are destroying the undergrowth and humus and thinning out the trees, thus diminishing the commercial value of the forest, facilitating the erosion of the soil and lessening its capacity for storing water

which it may be wasted or become harmful to the point where it shall be applied to some useful purpose. A mill race is a diversion canal on a small scale, and the Chesapeake and Ohio Canal, which diverts a part of the waters of the Potomac to a channel where they may be useful to navigation, falls in a similar class. In connection with the irrigation projects of the Reclamation Service, diversion canals constitute an important feature. In some instances they lead directly from rivers which are capable of furnishing sufficient water at all stages; in other instances they lead from reservoirs where water is stored to maintain the desired flow when the tributary streams would be inadequate to the purpose. In none of these cases has the diversion canal any special relation to the conservation of water. It introduces a siding in the general through route of circulation and discharges its water freight at the point where it is wanted. It serves in some measure to regulate surface flow, but that object is subsidiary to a major purpose, which may be power or irrigation or navigation.

Canalization is a method of river control which consists in reducing the river to the condition of a canal by the introduction of dams, locks, and sluice gates. The current of the open river is then replaced by slack water. The discharge is permitted through locks as required by passing boats, or over sluiceways when the volume of flood run-off becomes greater than the amount which can be safely stored in any reach of the river between dams. The most important project for canalization is that of the Ohio River, concerning which we may quote from the report of a board of army engineers, dated December 15, 1906.[3]

The board finds—

> that a six-foot navigation at low water can be established in the Ohio River from Pittsburg to Cairo by the construction of forty-five locks with movable dams, at an estimated cost of $50,962,266, in addition to funds heretofore appropriated and authorized; that a nine-foot navigation over the same length of river can be established by the construction of fifty-four locks and dams, at an estimated cost of $63,731,488. * * *
>
> The board gives exhaustive consideration to the question of present and probable commerce, both down stream and up, and it appears that the present commerce of the river is approximately 9,000,000 tons per annum, of which a large proportion is downstream. Having in view the fact that a canalized river offers an upstream navigation lower in cost and quicker in transit than an open-river project, the board, arguing from the known natural resources of the section and its population, concludes that a river improved by this method will afford facilities for the cheap exchange of mineral, agricultural, and manufactured commodities, which from their low value and bulk cannot be exchanged unless such cheap facilities are offered, and that there is every probability that the improvement of the Ohio River by canalization, as proposed, would induce a very large future commerce, which does not now exist, in addition to retaining and greatly facilitating and cheapening the commerce which the river now bears.

In discussing the maintenance of the nine-foot project, the board estimates it at $800,000 per annum, not including the dredging of silt, which would accumulate in slack water, or at $1,000,000 per annum if this item be included.

This project, which was reviewed and recommended without qualification by the Board of Engineers for Rivers and Harbors, in a report dated October 18, 1907, has for its object the single purpose of promoting inland navigation, and it illustrates clearly the relation which any plan for canalization of a stream bears to the general problem of water circulation. The plan deals with the water after it has reached a navigable river, when it is no longer a question of control of surface waters, but merely one of more or less effectively regulating their distribution and flow. The delay which may be imposed by storage in slack-water basins is not an appreciable factor in reducing the damage due to floods such as those which now annually work havoc in the Ohio Valley. Moreover, the project itself establishes interests which lie within the zone liable to flood, and in proportion as it is successful and such in-

[3] 60th Cong., 1st sess., H. R. Doc. 492.

Original Southern Appalachian Mountain Forest, Transylvania County, North Carolina

Conveyance of Water for Irrigation. Tunnel of Bear River Canal, Utah

Link River and Gravity Irrigation Ditch, Klamath County, Oregon. In the Same Section of Country as the Government's Klamath Project

terests grow in value, so grows the necessity for diminishing and preventing floods. Thus canalization bears the same relation to plans for conserving and controlling water circulation that any concentration of civilization bears to it. It increases the burden of responsibility for proper measures of control, whether in detail as applied to raindrops or in gross as applied to flood run-off, and the larger the wealth to be protected the greater the justification for large expenditures on account of protection; but more than this, for it is not a question of engineering and financial expense alone; the larger the national interests involved the greater the individual responsibility of every patriotic citizen to his local community and to the commonwealth in general for a proper discharge of his obligation to take care of his share of the Nation's assets.

CONTROL OF GROUND STORAGE AND RUN-OFF THROUGH AGRICULTURE

On a reasonable estimate one-half of the domain of the United States must eventually be farmed to maintain the population and prosperity of the country. The essential characteristics of the great farming area, exclusive of irrigation districts, is that it shall have soil and sufficient rainfall. Rain falling on soil is partly stored as ground water, but also partly runs off. The stored water is absolutely necessary to the farmer's prosperity, which will increase as he increases ground storage; the other is wasted, and if it causes erosion is destructive.

In considering the relation of the farmer's activities and the methods which he can employ to increase ground storage and decrease erosion we must distinguish between lands that are level or nearly so and lands that have a more or less pronounced slope.

Water control on plains.—In regions of great plains or plateaus, where lands are level or nearly so, the methods which may be used by the farmer to increase ground-water storage are the methods of good tillage which at the same time yield the largest crops. They consist in deep plowing, proper cultivation during the growing season, crop rotation, and the maintenance of an open condition of the soil during the periods of fallow. The object of these methods is to increase the capacity of the soil reservoirs and to open and keep open the channels through which the rain or melting snow has access to them. Run-off and erosion are restricted in proportion as this aim is secured.

To grow large crops takes a large amount of soil moisture. The soil gets it directly from rains or in seasons of drought from the ground water which is supplied by rains that pass down through the soil to the water table. The rain that soaks in is stored for the crop. The rain that runs off is taken from what might be stored, and is not only lost water but, being muddy, is also lost soil. Good tillage reduces these losses by maintaining those conditions of soil and subsoil under which a large proportion of a given rainfall will be absorbed.

In general, we say that an open soil will absorb most water. The openness of texture of a soil depends upon the sizes of the particles of which it is composed and the relative numbers of particles of these several sizes—that is, its mechanical composition. There is for any kind of soil a state at which it is in the loosest and best physical condition—that is to say, a state of arrangement of soil particles according to size and spacing in which there may be the largest amount of water gathered about the particles as capillary films and between them in delicate columns. The condition is one which is well known to farmers as that which will yield the best crops. This mechanical condition of the soil is reached by plowing, harrowing, and cultivating when the soil is neither too moist nor too dry.

The facility with which rain enters a soil depends upon its being in the above-described condition—open, yet

View of a Great National Irrigation Project. Congressional Party Gathered in Circle During Speaking at the Opening of the Newly Completed Headworks of the Main Truckee Canal, Nevada

Irrigated Strawberries Pipe for Carrying Water Shown in Front of Picture

not too open. The films of water within it are then of such size and are so distributed that they support the open texture. When rain falls it enters each little capillary tube between the grains and penetrates rapidly in the many minute channels. Thus the soil, though moist, absorbs more water than if it had been drier to begin with.

When soil is very dry and powdery rain does not penetrate far into it. There are several conditions that produce this well-known result. Much water is used in filling the large volume of the small spaces between the soil grains; the capillary films are still separate at the bottom of the sinking moisture and they sink deeper only as they join, and the air in the soil, being imprisoned by the water that fills the upper layer, offers effective resistance to percolation.

The absorbent character of a soil determines the amount which the immediate surface will take in, but it does not determine the rate at which water will soak into the lower layers of the soil and subsoil; if the latter is impermeable, the pores of the surface soil may become so filled that no more water can enter, and the rest of the rain runs off. This happens when a heavy rain falls on a field that has been plowed only three or four inches deep, leaving an unbroken, clayey subsoil. If the field is level, pools of water will stand over it till they dry up. If the field be on a slope, the gathering water runs off along and across the shallow furrows and takes more or less soil with it. Where the subsoil is broken to twelve or fourteen inches by deep disk plowing the same heavy rain sinks in completely and is stored for the crops when needed. The soil also stays.

Thus on plains the conditions which affect percolation of rain into the soil and subsoil and which are consequently to the advantage of ground-water storage are—

(*a*) That the cultivated surface shall be level or but gently sloping;

(*b*) That the surface soil shall be in that condition which is best described by the gardener's term of "live soil;"

(*c*) That the lower soil and subsoil should afford the largest possible amount of space into which the water from the surface may run.

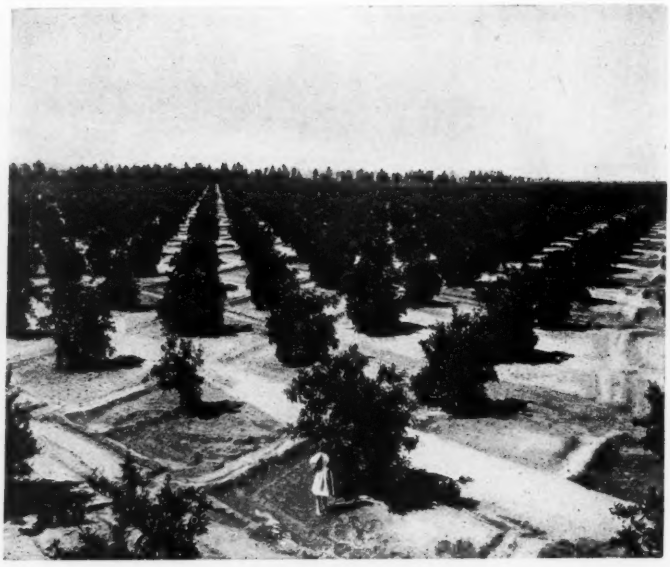
Another means which is at the farmer's disposal is that of crop rotation. Clean cropping year after year exhausts the plant food and humus of the soil, affects unfavorably the mechanical condition of the soil, and brings it into a state in which its fertility is greatly reduced and it is most easily eroded. In order that these effects should be prevented it is important to introduce a rotation of crops, including grass or clover, whose deep and thickly matted roots help to open up the texture of the soil and to restore that essential constituent, humus.

We have thus far considered only how the farmer can produce a condition of the soil and subsoil which will reduce run-off and increase ground storage. It is also important when the water is in the ground to keep it there, except as crops need it. It should not be wasted by useless plants nor by evaporation.

The waste by weeds is obvious. A growing weed takes water which the useful crop might have. The remedy—keeping out weeds—is equally obvious and is limited simply by cost.

Evaporation exhausts ground water most effectively when there is free circulation from the ground water to the surface. This happens when the films of water about the soil grains are in contact and there is ready movement in them. As the water immediately at the surface is vaporized an additional supply is drawn to the surface through the capillary films from below. This is evaporated in turn and more is drawn up, and so through evaporation and capillary attraction the soil moisture is gradually dissipated into the air.

That condition of dryness which stops the upward movement of ground water by breaking the continuous water films is not readily established in humid regions, where the ground water lies not far below the surface and rains are not infrequent. Thus it appears that since in humid regions the farmer can-



Orange Grove, Showing Method of Basin Irrigation

not effectively restrict evaporation, he must resort throughout the entire year to every method of cultivation, and from year to year to the method of crop rotation, to keep his ground in the best possible condition for the largest storage of ground water, from which will follow also the largest return of any one crop. In the arid region nature comes to the aid of the farmer and gives him a means of stopping the loss of the precious moisture of which under the best conditions he can scarcely conserve enough.

When the farmers of America understand how to store and keep water in the ground they will have learned how to grow larger crops. Our average yield of wheat instead of being as it now is fourteen bushels to the acre, will then be nearer the average yield of Great Britain, thirty-two bushels.

Water control on slopes.—In regions where steep slopes are cultivated the methods appropriate to level fields find their application also, but they are insufficient, for the tendency of the water to run off lessens the time of its contact with the surface, and thus increases the proportion which escapes at the expense of the proportion that is stored. In a like degree erosion begins and is maintained on slopes, the soil is undercut and removed, and the subsoil or rock exposed. Forests would prevent this, but if the steep slope is cleared for cultivation it is necessary to substitute a series of steps for the smoothly inclined surface, in order to reduce these effects to a minimum.

This introduces a condition which is not yet necessary in America to any great extent, but which is general throughout Europe and Asia, namely, terracing. The object is to catch rain and snow on a level. The level may be the furrows of a plow or of a harrow, provided the slope be so gentle that these suffice to hold back the water and prevent it from running and gullying the fields. On steeper slopes the harrow and the plow are inadequate, and the farmer is obliged to introduce low steps or terraces which vary in character from a little bank of sward to walls of stone. The fields above the

Reclaimed Desert Lands, Southern California: Formerly Covered with Cactus. In the Foreground a Young Orchard, behind This an Older Orchard, and in the Distance the Arid Hills

A Typical Forest Scene in Western Washington

banks of sward or above the stone wall are carefully leveled and the water which falls upon them is retained. Agriculture is thus extended not only over far-spreading plains and lowlands, but up the steep banks of river gorges and ravines. The famous vineyards of the Rhine are planted on rock wall terraces, on steep slopes such as we abandon to erosion. As our population increases and the demand for agricultural land becomes more urgent we, too, will build terraces, and high river banks throughout the humid regions will grow special products. Land hunger will eventually force us to it—not soon, however—and in the meantime our steep, cleared lands cannot be left a prey to erosion. They must be recovered where gullied and must be protected from gullying by watchful care, such as that which guards Holland from the sea. Our enemy is no less dangerous, not a whit less insidious and persistent. Since terracing is a possibility of the future only, we must restore the forest trees. They have held the soil during ages and on them we can confidently rely.

We are wont to think that reforestation is a need of high mountains only, but the need is not thus limited. It extends to all steep cleared slopes. Thousands of miles of these stretch along our rivers, from Georgia to Maine, from Mississippi to Minnesota. Throughout the humid region they border every river. Along all their length, in all their ramifications that penetrate the richest agricultural districts, they must necessarily be covered by trees.

From the plains and gentle slopes appropriate to farming there rise in all hill and mountain districts steeper slopes that are not appropriate to farming. When farmed they are quickly eroded and destroyed. It may be set down as an obvious economic principle that no land is appropriate to a use which destroys its usefulness. This principle is not affected by the fact that ignorant persons clear and cultivate such land extensively. In the southern Appalachian Mountains it is commonly but five years from virgin forest to abandoned fields. The mountain slopes are not agricultural lands. Themselves destroyed by erosion, they damage other lands and the water courses below them. When that damage is assessable by law upon the ignorance that causes it, agriculture will be restricted to appropriate fields.

(To be concluded)

Salt River Dam Site, Arizona

A MILLION WOMEN FOR CONSERVATION

IN HER report as chairman of the waterways committee of the District of Columbia Federation of Women's Clubs, at the annual meeting held in Washington, D. C., May 5, 1909, Mrs. Lydia Adams-Williams, the writer and lecturer on conservation, and the first woman to take up the work, said in part:

"The subject of the conservation of the natural resources of the Nation is the uppermost one before the people of the United States to-day.

"The District of Columbia Federation of Women's Clubs has the honor of being the first woman's organization to adopt resolutions in favor of the conservation of natural resources; these resolutions were adopted in November, 1907, following an address by your chairman on 'waste of natural resources and need for conservation.' In this great movement, it is a high honor and one for congratulation that the D. C. Federation of Women's Clubs led all the other women's clubs of the country in the national movement for conservation. The resolutions were published in full in CONSERVATION, the official magazine of the American Forestry Association, in the issue of May, 1908.

"The second woman's organization to adopt conservation and to take active interest in the work is the National Society of the Daughters of the American Revolution. Your chairman submitted the resolution on conservation which the D. A. R. adopted, and she especially urged them to take up the work. The resolution was adopted in April, 1908, at the time of the annual convention, by the National Executive Board. The resolution was published in CONSERVATION, in the issue of May, 1908, and it also received wide publicity throughout the United States.

"The third woman's organization to adopt conservation is the General Federation of Women's Clubs. In June, 1908, your chairman attended the biennial meeting of the General Federation of Women's Clubs, in Boston, as a representative of the D. C. Federation of Women's Clubs, and as one of the speakers on forestry; also as the representative of the magazine CONSERVATION.

"In May, 1908, before the biennial convention, your chairman wrote Mrs. Decker about forming a conservation committee in the General Federation; and, while at the convention in Boston, she urged upon Mrs. Decker, the outgoing president, and upon Mrs. Moore, the incoming president, and upon many of the officers and directors of the General Federation the necessity of appointing a conservation committee. Later, after the adjournment of the biennial, she wrote Mrs. Philip N. Moore, the new president, and again urged the formation of a conservation committee; Mrs. Moore replied, in September, 1908, as follows: 'At our recent board meeting in Colorado Springs we made a subcommittee on waterways, which, with our present committee on forestry, will form our conservation committee.' Later the subcommittee on waterways was changed to a regular committee.

"Your chairman also attended the Woman's National Rivers and Harbors Congress, and spoke on conservation, and made a motion, which, after debate, was carried, changing the constitution to include conservation as one of the objects of the organization.

"To summarize briefly, the four leading women's organizations of the United

States, comprising nearly a million members, and embracing practically all the women's clubs in the country, have taken up conservation in the following order, and that your chairman is the one who urged them to take up the work, who wrote the resolutions, and who addressed them on the subject of conservation:

"1. The District of Columbia Federation of Women's Clubs, with seventeen affiliated clubs and 5,000 members, adopted conservation November, 1907.

"2. The National Society of the Daughters of the American Revolution, with 956 chapters and over 58,000 active members, represented in every state in the Union and in Mexico, Havana, and Hawaii, adopted conservation in April, 1908.

"3. The General Federation of Women's Clubs, with over 5,000 affiliated clubs and a membership of 800,000, with clubs in every state and in China, England, India, Mexico, South America, and West Australia, added a waterways committee to the forestry committee, 'to form a conservation committee,' in September, 1908.

"4. The Woman's National Rivers and Harbors Congress, organized in June, 1908, with seven members, which has now grown to a strength of 12,000, adopted conservation of the natural resources as a part of the constitution at the biennial meeting at Washington, D. C., in December, 1908."

THE GREAT TREES OF CALIFORNIA

By ARCHIBALD HOPKINS

Deep rooted in the bosom of the earth,
  Thirsting for light, they thrust their tops on high,
To hold communion with the bending sky,
  Whispering their ancient lineage and birth,
And far-off memories of a slender girth.
  They listen to the swooping eagle's cry;
They murmur gently to the zephyr's sigh
  Mingling soft breathings with the songster's mirth.
Unmoved, they see the centuries come and go;
Thousands of years their towering, titan forms
Have stood defiant to the fiercest storms.
  Like sculptured pillars toward the blue they soar;
The dim, majestic forest aisles below—
  Nature's vast temple, mystical and hoar.

HOW THE HOUSE VOTED

An Analysis of the Vote of March 1, 1909, in the House of Representatives on the Weeks Bill

By EDWIN A. START, Boston, Mass.

ON THE 1st of March, 1909, the Weeks bill, so-called, reported by a majority of the Committee on Agriculture, was debated for two hours in the House of Representatives and passed by a vote of 157 to 147. While no mention was made in the bill of the Southern Appalachian or White Mountain forests, the measure being general in its form, it was understood to be framed primarily in the interest of these great national projects, they being conceded to be the most urgently needed enterprises in the way of water protection. Votes for or against this bill were therefore votes for or against the Appalachian forests. As this was the only time in which the question had come to an issue on the floor of the House a careful study of the vote is worth while and we ask the attention of the press and friends of the measure throughout the country to the data given below.

How did your representative vote?

THE ROLL CALL

The Vote in the House of Representatives on the So-called "Weeks Bill," S. 4825, on March 1, 1909, Was as Follows:

YEAS, 157

Acheson
Allen
Ashbrook
Bartholdt
Bates
Bede
Bell, Ga.
Bennet, N. Y.
Bennett, Ky.
Brodhead
Brownlow
Brundidge
Burleigh
Burnett
Burton, Del.
Calder
Candler
Capron
Cassel
Caulfield
Cockran
Cocks, N. Y.
Cole
Cook, Pa.
Cooper, Pa.
Cooper, Tex.
Cooper, Wis.
Coudrey
Craig
Crawford
Currier
Darragh
Davidson
Davis
Dawes
Danby
Denver
Diekema
Douglas
Draper
Edwards, Ky.
Ellerbe
Esch
Estopinal
Favrot
Finley
Flood
Foelker
Fornes
Foster, Ind.
Foster, Vt.
Foulkrod
Fuller
Gaines, Tenn.
Gardner, Mass.
Gardner, N. J.
Gilhams
Gill
Gillespie
Gillett
Glass
Godwin
Goldfogle
Greene
Guernsey
Hale
Hall
Hamilton, Mich.
Harding
Harrison
Haskins
Heflin
Henry, Conn.
Hepburn
Higgins
Hill, Conn.
Hinshaw
Hitchcock
Hobson
Hubbard, W. Va.
Hughes, N. J.
Hull, Iowa
Hull, Tenn.
Humphreys, Miss.
Johnson, S. C.
Jones, Va.
Keliher
Kennedy, Ohio
Kimball
Kinkaid
Lamb
Landis
Langley
Law
Lawrence
Lee
Lenahan
Lever
Longworth
Loud
Lovering
McCall
McKinney
McLachlan, Cal.
McLaughlin, Mich.
McMorran
Madison
Mann
Martin
Maynard
Moon, Tenn.
Morse
Mudd
Nelson
Nicholls
O'Connell
Padgett
Page
Parsons
Perkins
Peters
Pollard
Porter
Pou

Prince
Rainey
Ransdell, La.
Reeder
Reynolds
Richardson
Roberts
Robinson
Ryan
Saunders
Slemp
Small
Sperry
Stanley
Stephens, Tex.
Sturgiss
Sulloway
Sulzer
Swasey
Talbot
Taylor, Ohio
Thomas, N. C.
Thomas, Ohio
Tirrell
Townsend
Waldo
Washburn
Watkins
Webb
Weeks
Wiley
Willett
Wood

NAYS, 147

Adair
Aiken
Alexander, Mo.
Andrus
Barchfeld
Barclay
Barnhart
Bartlett, Ga.
Beale, Pa.
Beall, Tex.
Bingham
Bonynge
Bowers
Boyd
Brantley
Burgess
Butler
Campbell
Carter
Chaney
Chapman
Clark, Mo.
Conner
Cook, Colo.
Cousins
Cox, Ind.
Crumpacker
Cushman
Dalzell
Davenport
Dawson
De Armond
Dixon
Driscoll
Durey
Dwight
Edwards, Ga.
Ellis, Oreg.
Englebright
Fairchild
Fassett
Ferris
Fitzgerald
Fordney
Foss
Foster, Ill.
Fowler
French
Gardner, Mich.
Garner
Garrett
Goebel
Gordon
Graff
Gregg
Gronna
Hackett
Hackney
Haggott
Hamilton, Iowa
Hamlin
Hammond
Hardwick
Hardy
Haugen
Hawley
Hay
Hayes
Helm
Henry, Tex.
Hill, Miss.
Holliday
Houston
Howard
Howell, N. J.
Howell, Utah
Howland
Hubbard, Iowa
Huff
Humphrey, Wash.
Jenkins
Johnson, Ky.
Jones, Wash.
Keifer
Kennedy, Iowa
Kitchin
Knopf
Knowland
Küstermann
Lindberg
Livingston
Lloyd
Lorimer
Loudenslager
Lowden
McCreary
McGavin
McGuire
McHenry
McKinlay, Cal.
Macon
Madden
Malby
Miller
Mondell
Moore, Pa.
Moore, Tex.
Murdock
Murphy
Needham
Nye
Overstreet
Parker
Payne
Pujo
Rauch
Rucker
Russell, Mo.
Russell, Tex.
Sabath
Scott
Shackleford
Sheppard
Sherley
Sherwood
Sims
Slayden
Smith, Cal.
Smith, Tex.
Snapp
Southwick
Spight
Stafford
Steenerson
Stevens, Minn.
Tawney
Thistlewood
Tou Velle
Underwood
Volstead
Vreeland
Wallace
Wheeler
Wilson, Ill.
Wilson, Pa.
Young
The Speaker

ANSWERED "PRESENT," 10

Booher
Cary
Cravens
Ellis, Mo.
Goulden
Griggs
McDermott
Olmstead
Riordan
Wanger

NOT VOTING, 72

Adamson
Alexander, N. Y.
Ames
Ansberry
Anthony
Bannon
Bartlett, Nev.
Birdsall
Boutell
Bradley
Broussard
Burke
Burleson
Burton, Ohio
Byrd
Calderhead
Caldwell
Carlin
Clark, Fla.
Clayton
Floyd
Focht
Fulton
Gaines, W. Va.
Graham
Hamill
Hughes, W. Va.
Jackson
James, Addison D.
James, Ollie M.
Kahn
Kipp
Knapp
Lafean
Lamar, Fla.
Lamar, Mo.
Laning
Lassiter
Leake
Legare
Lewis
Lindsay
McKinley, Ill.
McLain
McMillan
Marshall
Moon, Pa.
Mouser
Norris
Olcott
Patterson
Pearre
Pratt
Pray
Randell, Tex.
Reid
Rhinock
Rodenberg
Rothermel
Sherman
Smith, Iowa
Smith, Mich.
Smith, Mo.
Sparkman

Sterling	Weisse
Taylor, Ala.	Williams
Watson	Wolf
Weems	Woodyard

So the rules were suspended and the bill passed.

The Clerk announced the following pairs:

For the session:

Mr. Sherman with Mr. Riordan.
Mr. Boutell with Mr. Griggs.
Mr. Wanger with Mr. Adamson.

Until further notice:

Mr. Addison D. James with Mr. Lamar of Florida.
Mr. Woodyard with Mr. Taylor of Alabama.
Mr. Weems with Mr. Rothermel.
Mr. Watson with Mr. Williams.
Mr. Sterling with Mr. Rhinock.
Mr. Smith of Michigan with Mr. Reid.
Mr. Rodenberg with Mr. Pratt.
Mr. Moon of Pennsylvania with Mr. Lassiter.
Mr. McKinley of Illinois with Mr. Lamar of Missouri.
Mr. Smith of Iowa with Mr. Randell of Texas.
Mr. Pray with Mr. Patterson.
Mr. Pearre with Mr. McDermott.
Mr. Olcott with Mr. McLain.
Mr. Norris with Mr. Leake.
Mr. Lafean with Mr. Kipp.
Mr. Knapp with Mr. Hamill.
Mr. Kahn with Mr. Cravens.
Mr. Hughes of West Virginia with Mr. Floyd.
Mr. Gaines of West Virginia with Mr. Clark of Florida.
Mr. Focht with Mr. Carlin.
Mr. Calderhead with Mr. Caldwell.
Mr. Burke with Mr. Byrd.
Mr. Birdsall with Mr. Broussard.
Mr. Anthony with Mr. Burleson.
Mr. Bannon with Mr. Bartlett of Nevada.
Mr. Olmsted with Mr. Ollie M. James.
Mr. Marshall with Mr. Fulton.
Mr. Burton of Ohio with Mr. Clayton.
Mr. Alexander of New York with Mr. Sparkman.
Mr. McMillan with Mr. Ansberry.
Mr. Ellis of Missouri with Mr. Smith of Missouri.
Mr. Cory with Mr. Weisse.
Mr. Graham with Mr. Legare.
Mr. Jackson with Mr. Wolf.
Mr. Ames with Mr. Lindsay.

On this vote:

Mr. Goulden with Mr. Bradley.

The SPEAKER. The Clerk will call my name.

The Clerk called the name of the Speaker, and he voted "No," as above recorded.

The result of the vote was then announced as above recorded.—*Cong. Record.*

SUMMARY BY STATES AND SECTIONS

States	Vote on Weeks bill, Sixtieth Congress			Sixty-first Congress Alignment on Weeks bill			
	Yeas	Nays	Not voting	Yeas	Nays	Not recorded	New members
NEW ENGLAND							
Maine	4	..	..	4	..	..	..
New Hampshire	2	..	..	2	..	..	..
Vermont	2	..	..	1	..	..	1
Massachusetts	13	..	1	13	..	1	..
Rhode Island	1	..	1[1]	1	..	..	1
Connecticut	4	..	1[2]	4	..	..	1
	26	..	3	25	..	1	3
MIDDLE							
New York	17	11	9	13	11	7	6
New Jersey	3	4	3	3	4	1	2
Pennsylvania	10	12	10[3]	6	11	8	7
Delaware	1	..	..	..	..	..	1
	31	27	22	22	26	16	16

[1]No member from one district.
[2]The Member-at-large, Mr. Lilley, who would have voted for the bill, was then serving as governor of Connecticut.
[3]One member not reported

SUMMARY BY STATES AND SECTIONS—continued

States	Vote on Weeks bill, Sixtieth Congress			Sixty-first Congress Alignment on Weeks bill			
	Yeas	Nays	Not voting	Yeas	Nays	Not recorded	New members
CENTRAL							
Michigan	8	3	1	7	3	1	1
Ohio	10	5	6	8	5	1	6
Indiana	3	9	1	..	6	..	7
Illinois	5	13	6	5	12	5	3
Wisconsin	5	4	2	5	2	2	2
Minnesota	2	7	..	1	7	..	1
Iowa	2	7	2	1	4	1	5
Missouri	3	9	4	2	7	1	6
North Dakota	..	1	1	..	1	..	1
South Dakota	2	..	..	1	..	..	1
Nebraska	4	1	1	3	..	1	2
Kansas	2	4	2	2	4	2	..
Oklahoma	..	4	1	..	3	..	2
	46	67	27	35	54	14	37
ROCKY MOUNTAIN AND COAST							
Montana	..	..	1	..	..	1	..
Wyoming	..	1	..	..	1	..	..
Colorado	..	3	..	..	..	..	3
Nevada	..	..	1	..	..	1	..
Idaho	..	1	..	..	..	..	1
Utah	..	1	..	..	1	..	..
Washington	..	3	..	..	2	..	1
Oregon	..	2	..	..	2	..	..
California	1	6	1	1	6	1	..
	1	17	3	1	12	3	5
SOUTHERN							
Maryland	3	..	3	3	..	1	2
Virginia	7	1	2	7	1	2	..
West Virginia	2	..	3	2	..	3	..
Kentucky	5	3	3	4	3	2	2
Tennessee	6	4	..	4	4	..	2
North Carolina	7	2	1	6	1	..	3
South Carolina	4	1	2	4	1	2	..
Georgia	2	6	3	2	6	2	1
Florida	..	..	3	..	..	2	1
Alabama	6	2	1	5	2	1	1
Mississippi	2	3	3	2	2	1	3
Louisiana	4	1	1	3	1	1	1
Arkansas	2	2	3	1	2	3	1
Texas	3	11	2	2	11	2	1
	53	36	30	45	34	22	18

The influence of the party leaders on both sides of the House has always been used against this legislation. Its weakness in certain sections is attributable to the strength of the party machine with the representatives from those sections. It is also to be observed that west of the Mississippi there were but nineteen votes for the measure, while fifty-six were cast against it. Is this the return that the men of the West make for the liberal way in which the national treasury and the vast national domain has been used to build up the states of the far West and to insure their future prosperity?

PARTY DIVISION

The party alignment on this essentially non-partisan measure has no especial significance, but it is of some interest and the facts it shows may be of service. Expressed in percentages .429 of the Republicans and .376 of the

Democrats voted for the bill and .388 of the Republicans and .376 of the Democrats voted against it. Those not voting were almost equally divided as to political affiliations. Therefore on this question the Democratic leaders seem to have held their forces rather better than the Republicans, notwithstanding the number of Democratic states that were directly interested. The following table shows the vote by states as divided on party lines:

	Yea		Nay		Not voting	
	R.	D.	R.	D.	R.	D.
Alabama	..	6	..	2	..	1
Arkansas	..	2	..	2	..	3
California	1	..	6	..	1	..
Colorado	..	..	3	..	..	..
Connecticut	4	..	..	..	1	..
Delaware	1	..	..	..	..	..
Florida	..	..	..	..	..	3
Georgia	..	2	..	6	..	3
Idaho	..	..	1	..	..	..
Illinois	4	1	11	2	3	3
Indiana	3	..	5	4	1	..
Iowa	2	..	6	1	2	..
Kansas	2	..	4	..	2	..
Kentucky	3	2	..	3	1	2
Louisiana	..	4	..	1	..	1
Maine	4	..	..	..	..	..
Maryland	1	2	..	..	2	1
Massachusetts	10	3	..	..	1	..
Michigan	8	..	3	..	1	..
Minnesota	2	..	6	1	..	..
Mississippi	..	2	..	3	..	3
Missouri	3	..	..	9	1	3
Montana	..	..	..	..	1	..
Nebraska	3	1	1	..	..	1
Nevada	..	..	..	..	..	1
New Hampshire	2	..	..	..	..	..
New Jersey	2	1	4	..	..	3
New York[1]	9	7	10	1	6	3
North Carolina	..	7	..	2	..	..
North Dakota	..	..	1	..	1	..
Ohio	8	2	3	2	5	1
Oklahoma	..	..	1	3	..	1
Oregon	..	..	2	..	..	..
Pennsylvania	7	3	10	2	7	2
Rhode Island	1	..	..	..	..	..
South Carolina	..	4	..	1	..	2
South Dakota	2	..	..	..	..	..
Tennessee	2	4	..	4	..	..
Texas	..	3	..	11	..	2
Utah	..	..	1	..	..	..
Vermont	2	..	..	..	..	..
Virginia	1	6	..	1	..	2
Washington	..	..	3	..	..	..
West Virginia	2	..	..	..	3	..
Wisconsin	5	..	3	1	1	1
Wyoming	..	..	1	..	..	..
	94	62	85	62	40	41

RECORD OF THE STATE DELEGATIONS

Members whose names have an asterisk (*) are not members of the Sixty-first Congress. The new members who takes their places in the present Congress are given at the end of each state list. The figures preceding the names are the numbers of the Congressional districts.

Yea	Nay	Not voting
Alabama		
2. A. A. Wiley*	3. H. D. Clayton	1. G. W. Taylor
4. W. B. Craig	9. O. W. Underwood	
5. J. T. Heflin		
6. R. P. Hobson		
7. J. L. Burnett		
8. Wm. Richardson		
New member.—2, S. H. Dent, Jr., D.		
Arkansas		
2. S. Brundidge, Jr.*	1. R. B. Macon	3 J. C. Floyd
6. J. T. Robinson	7. R. M. Wallace	4. W. B. Cravens
		5. C. C. Reid
New member.—2, W. A. Oldfield, D.		
California		
7. J. McLachlan	1. W. F. Englebright	4. J. Kahn
	2. D. E. McKinlay	
	3. J. R Knowland	
	5. E. A. Hayes	
	6. J. C. Needham	
	8. S. C. Smith	

[1]One independent from New York voted "Yea."

	Yea	Nay	Not Voting
Colorado			
		At large. G. W. Cook*	
		1. R. W. Bonynge*	
		2. W. A. Haggott*	
	New members.—At large, E. T. Taylor, D.; 1, A. W. Rucker, D.; 2, J. A. Martin, D.		
Connecticut			
	1. E. S. Henry		*At large.* G. L. Lilley* (Mr. Lilley was in Connecticut serving as governor)
	2. N. D. Sperry		
	3. E. W. Higgins		
	4. E. J. Hill		
	New member.—At large, J. Q. Tilson, R.		
Delaware			
	At large. R. Burton*		
	New member.—At large, W. H. Heald, R.		
Florida			
			1. S. M. Sparkman
			2. F. Clark
			3. W. B. Lamar*
	New member.—3, D. H. Mays, D.		
Georgia			
	7. Gordon Lee	1. C. G. Edwards	2. J. M. Griggs
	9. T. M. Bell	5. L. F. Livingston	3. E. B. Lewis*
		6. C. L. Bartlett	4. W. C. Adamson
		8. W. M. Howard	
		10. T. W. Hardwick	
		11. W. G. Brantley	
	New member.—3, D. M. Hughes, D.		
Idaho			
		At large. B. L. French*	
	New member.—At large, Thomas R. Hamer, R.		
Illinois			
	2. J. R. Mann	1. M. B. Madden	4. J. T. McDermott
	12. C. E. Fuller	3. W. W. Wilson	9. H. S. Boutell
	14. J. McKinney	5. A. J. Sabath	17. J. R. Sterling
	15. G. W. Prince	6. W. Lorimer	19. W. B. McKinley
	20. H. T. Rainey	7. Philip Knopf*	21. B. F. Caldwell*
		8. Charles McGavin*	22. W. A. Rodenberg
		10. G. E. Foss	
		11. H. M. Snapp	
		13. F. O. Lowden	
		16. J. V. Graff	
		18. J. G. Cannon	
		23. M. D. Foster	
		24. P. T. Chapman	
	New members.—7, Fred Lundin, R; 8, Thomas Gallagher, D.; 21, J. M. Graham, D.		
Indiana			
	1. J. H. Foster*	2. J. C. Chaney*	6. J. E. Watson*
	9. C. B. Landis*	3. W. E. Cox	
	12. C. C. Gilhams*	4. L. Dixon	
		5. E. S. Holliday*	
		7. J. Overstreet*	
		8. J. A. M. Adair	
		10. E. D. Crumpacker	
		11. G. W. Rauch	
		13. H. A. Barnhart	
	New members.—1, J. W. Boene, D.; 2, W. A. Cullop, D.; 5, R. W. Moss, D.; 6, W. O. Barnard, R.; 7, Charles A. Korbly, D.; 9, M. A. Morrison, D.; 12, Cyrus Cline, D.		
Iowa			
	7. J. A. Hull	1. C. A. Kennedy	3. B. P. Birdsall*
	8. W. P. Hepburn*	2. A. F. Dawson	9. W. I. Smith
		4. G. N. Haygen	
		5. R. G. Cousins*	
		6. D. W. Hamilton*	
		10. J. P. Conner*	
		11. E. H. Hubbard	
	New members.—3, C. E. Pickett, R.; 5, J. W. Good, R.; 6, N. E. Kendall, R.; 8, W. D. Jamieson, D.; 10, F. P. Woods, R.		

	Yea	Nay	Not voting
Kansas			
	6. W. A. Reeder	2. C. F. Scott	1. D. R. Anthony
	7. E. H. Madison	3. P. R. Campbell	5. W. A. Calderhead
		4. J. M. Miller	
		8. V. Murdock	
Kentucky			
	2. A. O. Stanley	4. B. Johnson	1. O. M. James
	7. W. P. Kimball*	5. S. Sherley	3. A. D. James*
	9. J. B. Bennett	8. H. Helm	6. J. L. Rhinock
	10. J. W. Langley		
	11. D. C. Edwards		
	New members.—3, R. Y. Thomas, Jr., D.; 7, J. C. Cantrill, D.		
Louisiana			
	1. A. Estopinal	7. A. P. Pujo	3. R. F. Broussard
	4. J. T. Watkins		
	5. J. E. Ransdell		
	6. G. K. Favrot*		
	New member.—6. R. C. Wickliffe, D.		
Maine			
	1. A. L. Allen		
	2. J. P. Swasey		
	3. E. C. Burleigh		
	4. F. E. Guernsey		
Maryland			
	2. J. F. C. Talbott		1. W. H. Jackson*
	4. John Gill, Jr.		3. H. B. Wolf*
	5. S. E. Mudd		6. G. A. Pearre
	New members.—1, J. H. Covington, D.; 3, John Kronmiller, R.		
Massachusetts			
	1. G. P. Lawrence		5. B. Ames
	2. F. H. Gillett		
	3. C. G. Washburn		
	4. C. Q. Tirrell		
	6. A. P. Gardner		
	7. E. W. Roberts		
	8. S. W. McCall		
	9. J. A. Keliher		
	10. J. F. O'Connell		
	11. A. J. Peters		
	12. J. W. Weeks		
	13. W. S. Greene		
	14. W. C. Lovering		
Michigan			
	1. E. Denby	3. W. Gardner	6. S. W. Smith
	2. C. E. Townsend	8. J. W. Fordney	
	4. E. L. Hamilton	12. H. O. Young	
	5. G. J. Diekema		
	7. H. McMorran		
	9. J. C. McLaughlin		
	10. G. A. Loud		
	11. A. B. Darragh*		
	New member.—11, George A. Loud, R.		
Minnesota			
	3. C. R. Davis	1. J. A. Tawney	
	8. A. Bede*	2. W. S. Hammond	
		4. F. C. Stevens	
		5. F. M. Nye	
		6. C. A. Lindbergh	
		7. A. R. Volstead	
		9. H. Steenerson	
	New member.—8, Clarence B. Miller, R.		
Mississippi			
	1. E. S. Candler, Jr.	2. T. Spight	5. A. M. Byrd
	3. B. G. Humphreys	4. W. S. Hill*	7. F. A. McLain*
		6. E. J. Bowers	8. J. S. Williams*
	New members.—4, T. U. Sisson, D.; 7, W. A. Dickson, D.; 8, J. W. Collier, D.		

	Yea	Nay	Not voting
Missouri			
	10. R. Bartholdt	1. J. T. Lloyd	4. C. F. Booher
	11. H. S. Caulfield*	2. W. W. Rucker	5. E. C. Ellis*
	12. H. M. Coudrey	3. J. W. Alexander	13. M. R. Smith*
		6. D. A. DeArmond	16. R. Lamar*
		7. C. W. Hamlin	
		8. D. W. Shackleford	
		9. Champ Clark	
		14. J. J. Russell*	
		15. Thomas Hackney*	

New members.—5 W. P. Borland, D.; 11, P. F. Gill, D.; 13, P. Elvins, R.; 14, C. A. Crow, R.; 15, C. H. Morgan, R.; 16, A. P. Murphy, R.

Montana

At large. C. N. Pray

Nebraska

1. E. M. Pollard*	3. J. F. Boyd*	5. G. W. Norris
2. G. M. Hitchcock		
4. E. H. Hinshaw		
6. M. P. Kinkaid		

New members.—1, J. A. Maguire, D.; 3, J. P. Latta, D.

Nevada

At large. G. A. Bartlett

New Hampshire

1. C. A. Sulloway
2. F. D. Currier

New Jersey

2. J. J. Gardner	1. H. C. Loudenslager	8. Le G. Pratt*
4. I. W. Wood	3. B. N. Howell	9. E. W. Leake*
6. W. D. Hughes	5. C. N. Fowler	10. J. A. Hamill
	7. R. W. Parker	

New members.—8, W. H Wiley, R.; 9, E. F. Kinkead, D.

New York

1. W. W. Cocks	7. J. J. Fitzgerald	2. G. H. Lindsay
3. O. G. Foelker	19. J. E. Andrews	8. D. J. Riordan
4. C. B. Law	23. G. N. Southwick	15. J. Van V. Olcott
5. G. E. Waldo*	24. G. Fairchild	18. J. A. Goulden
6. W. M. Calder	25. C. Durey	20. T. W. Bradley
9. H. M. Goldfogle	26. G. R. Malby	21. S. McMillan*
10. William Sulzer	29. M. E. Driscoll	27. J. S. Sherman*
11. C. V. Fornes	30. J. W. Dwight	28. C. L. Knapp
12. W. B. Cockran*	31. S. E. Payne	36. De A. S. Alexander
13. H. Parsons	33. J. S. Fassett	
14. William Willett, Jr.	37. E. B. Vreeland	
16. F. B. Harrison		
17. W. S. Bennet		
22. W. H. Draper		
32. J. B. Perkins		
34. P. A. Porter*		
35. W. H. Ryan*		

New members.—5, Richard Young, R.; 12, M. F. Conry, D.; 21, Hamilton Fish, R.; 27, C. S. Millington, R.; 34, J. S. Simmons, R.; 35, D. A. Driscoll, D.

North Carolina

1. J. H. Small	2. C. Kitchin
3. C. R. Thomas	8. R. N. Hackett*
4. E. W. Pou	
6. H. L. Godwin	
7. R. N. Page	
9. E. Y. Webb	
10. W. T. Crawford*	

New members.—5, J. M. Morehead, R.; 8, C. H. Cowles, R.; 10, J. G. Grant, R.

North Dakota

At large. A. J. Gronna *At large.* T. F. Marshall*

New member.—L. B. Hanna, R.

	Yea	Nay	Not voting
Ohio			
	1. N. Longworth	2. H. P. Goebel	5. T. T. Ansberry
	3. J. E. Harding*	4. W. E. Tou Velle	10. H. T. Bannon*
	6. M. R. Denver	7. J. W. Keifer	13. G. E. Mouser*
	8. R. D. Cole	9. I. R. Sherwood	14. J. F. Laning*
	11. A. Douglas	20. P. Howland	16. C. L. Weems*
	12. E. L. Taylor, Jr.		21. T. E. Burton*
	15. B. G. Dawes*		
	17. W. A. Ashbrook		
	18. J. Kennedy		
	19. W. A. Thomas		

New members.—3, J. M. Cox, D.; 10, A. R. Johnson, R.; 13, C. C. Anderson, D.; 14, W. G. Sharp, D.; 15, James Joyce, R.; 16, D. A. Hollingsworth, R.

Oklahoma			
		1. B. S. McGuire	2. E. L. Fulton*
		3. J. S. Davenport*	
		4. C. D. Carter	
		5. Scott Ferris	

New members.—2, D. T. Morgan, R.; 3, C. E. Creager, R.

Oregon			
		1. W. C. Hawley	
		2. W. R. Ellis	
Pennsylvania			
	2. Joel Cook	1. H. H. Bingham	4. R. O. Moon
	5. W. W. Foulkrod	3. J. H. Moore	8. I. P. Wanger
	9. H. B. Cassel*	6. G. D. McCreary	13. J. H. Rothermel
	10. T. D. Nicholls	7. T. S. Butler	14. G. W. Kipp*
	11. J. T. Lenahan*	15. W. B. Wilson	17. B. K. Focht
	19. J. M. Reynolds	16. J. G. McHenry	18. M. E. Olmstead
	23. A. F. Cooper	21. C. F. Barclay	20. D. F. Lafean
	24. E. F. Acheson*	22. G. F. Huff	29. W. H. Graham
	25. A. L. Bates	27. J. G. Beale*	31. J. F. Burke
	26. J. D. Brodhead*	28. W. P. Wheeler	
		30. J. Dalzell	
		32. A. J. Barchfeld	

New members.—9, W. W. Griest, R.; 11, H. W. Palmer, R.; 12, A. B. Garner, R.; 14, C. C. Pratt, R.; 24, J. K. Tener, R.; 26, A M. Palmer, D.; 27, J. M. Langham, R.

Rhode Island			
	2. A. B. Capron		

New member.—1, W. P. Sheffield, R.

South Carolina			
	4. J. T. Johnson	3. W. Aiken	1. G. S. Legare
	5. D. E. Finley		2. J. O. Patterson
	6. J. E. Ellerbe		
	7. A. F. Lever		
South Dakota			
	At large. Philo Hall*		
	At large. E. W. Martin		

New member.—Charles H. Burke, R.

Tennessee			
	1. W. P. Brownlow	5. W. C. Houston	
	2. N. W. Hale*	8. T. W. Sims	
	3. J. A. Moon	9. F. J. Garrett	
	4. Cordell Hull	10. G. W. Gordon	
	6. J. W. Gaines*		
	7. L. P. Padgett		

New members.—2, R. W. Austin, R.; 6, J. W. Byrns, D.

Texas			
	2. S. B. Cooper*	1. M. Sheppard	4. C. B. Randell
	12. O. W. Gillespie	3. G. Russell	10. A. S. Burleson
	13. J. H. Stevens	5. Jack Beall	
		6. Rufus Hardy	
		7. A. W. Gregg	
		8. J. M. Moore	
		9. G. F. Burgess	
		11. R. L. Henry	
		14. J. L. Slayden	
		15. J. N. Garner	
		16. W. R. Smith	

New member.—2, Martin Dies, D.

	Yea	Nay	Not voting
Utah			
	At large. Joseph Howell		
Vermont			
	1. D. J. Foster		
	2. Kittredge Haskins*		
	New member.—2, Frank Plumley.		
Virginia			
	1. W. A. Jones	7. James Hay	4. F. Lassiter
	2. H. L. Maynard		8. C. C. Carlin
	3. John Lamb		
	5. E. W. Saunders		
	6. Carter Glass		
	9. C. B. Slemp		
	10. H. D. Flood		
Washington			
	At large. W. L. Jones*		
	At large. F. W. Cushman (now 2d dist.)		
	At large. W. E. Humphrey (now 1st dist.)		
	New member.—3, Miles Poindexter, R.		
West Virginia			
	1. W. P. Hubbard		3. J. H. Gaines
	2. G. C. Sturgiss		4. H. C. Woodyard
			5. J. A. Hughes
Wisconsin			
	1. H. A. Cooper	3. J. W. Murphy*	4. W. J. Cary
	2. J. M. Nelson	5. W. H. Stafford	6. C. H. Weisse
	7. J. J. Esch	9. G. Küstermann	
	8. J. H. Davidson	11. J. J. Jenkins*	
	10. E. A. Morse		
	New members.—3, Arthur W. Kopp, R.; 11, I. L. Lenroot, R.		
Wyoming			
	At large. F. W. Mondell		

Detail View of Completed West Entrance of Tunnel Just below Shoshone Dam Site on Canyon Road, Shoshone Project, Wyoming

EDITORIAL

How Water Transportation Saves

A large manufacturer in Pittsburg, Pa., who uses one and one-half million tons of coal annually, recently testified before a Congressional committee that his coal was brought from the mines to his mill, via the Monogahela River route, for 3½ to 4 cents a ton. When, however, navigation on the river was suspended for any reason the railroads charged 44 cents a ton for transporting the coal between the mines and the mill, or eleven times as much for the same service. —*From the Report of the Deep Waterways Committee of the Chicago Association of Commerce.*

A ratio of 3½ to 44! Is it a matter for surprise that, with traffic for long periods seriously congested, and Congress and the Interstate Commerce Commission endeavoring to regulate railway rates, the demand should be voiced for the rehabilitation of our inland waterways and their active use for purposes of navigation?

❧ ❧ ❧

Kansas City's Fight for Her River

KANSAS CITY, Mo., is pushing an aggressive campaign for the renewed use of the Missouri. The city feels that it is suffering from railway discrimination, and that its future is thereby menaced. Says the *New Orleans Picayune:*

Kansas City has found its trade placed at great disadvantage because the railroads that once made it a prominent commercial center have moved on and are bestowing their favors on other places, leaving Kansas City in the lurch.

For instance, an adjustment of railway rates recently gave cities south of Kansas City rates which shut Kansas City out of territory where it formerly sold large quantities of goods, and when an explanation was sought it was learned that the rates had been made because of potential or actual water competition from the East, via Galveston. Enjoying no such location, Kansas City was cut off from the benefits which cities south of it were given. An attempt was made to boycott the Missouri, Kansas and Texas Railway, in order to compel it to give Kansas City better rates, but this movement was met by a boycott against Kansas City in the territory affected. The only course which seemed open to Kansas City was to revive river transportation.

The *New Orleans Times-Democrat* says:

The Kansas City crusade is one of the most vigorous and best organized projects ever started in this country. That city has apparently made up its mind that its commercial and industrial prosperity depends upon reopening the Missouri River, and using it as a freight route to the Gulf. It is either "the river or—go back," says the *Kansas City Star,* and it expresses the opinion that Kansas City has reached its zenith unless it can free itself from the railroads and utilize the splendid opportunities offered it by the Missouri River.

It is maintained that the railroads have deliberately attempted to destroy transportation by water. Says the *Kansas City Star* of May 12th:

The railroads caused the decline of navigation on the Mississippi. They did it by paralleling the river with lines of tracks on each bank and by making the freight rates in competition with the steamboats so low that the boats could not meet the competition and live. Then the railroads bought the steamboat stock under fictitious names, took the boats out of the carrying trade and raised their rates to double the old steamboat rates and more.

The methods here described are, of course, not unfamiliar to the student of modern industrial warfare. The statements sound like echoes from the stories of meat and oil. The policy is sometimes to undersell your competitor until you have killed him; in other cases it is to bear the stock of his concern and buy it up at bottom figures, in either case making the consumer, afterwards, pay the cost of the process.

With characteristic energy and enterprise Kansas City is pushing what seems to be a practical project to remedy the situation. It is raising a mil-

lion dollars to get a boat-line on the Missouri River, "1,550 miles from blue water." The promoters of the enterprise plan to guard against the first of the methods whereby Mississippi River transportation was destroyed by securing pledges of patronage from shippers before the boat-line begins operations. To prevent the boat-line from falling into hostile hands a clause in the charter of the new company vests the voting power in the board of directors, who, it is said, will be free from railroad influence.

Says a promoter of the enterprise:

> We will build steel-hull boats of light draft that will carry the freight up and down the Missouri River and later into the Gulf of Mexico and through the Panama Canal to the Pacific coast.
>
> The Government is now spending an appropriation of $600,000 on the Missouri River between the Mississippi and the Kaw. This money is going into snagboats, lighthouses, and channel improvement. We are going to keep up the campaign for the improvement of the river. The Government, under the constitution, has control of the navigable streams of the country, and it is a government's duty to keep those streams in condition for traffic.
>
> St. Louis will profit almost as much by the steamboat lines as Kansas City.

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Missouri for Waterways

NOT only the city but the state is pushing the waterways fight. Governor Hadley has recently issued a statement giving figures to show discrimination in the matter of railway rates, and indicating that a certain railroad is endeavoring to block an investigation by the Interstate Commerce Commission into interstate rates in Missouri. Telegrams have been sent the Missouri senators asking them to protest against the investigation. Governor Hadley states that he has received several telephone messages advising him that agents along the line of the railway in question went to shippers and requested them to sign prepared telegrams protesting against this investigation.

The Missouri legislature is asking Federal aid for the Missouri River. The House of Representatives, by a vote of 110 to two, has recently adopted a joint and concurrent resolution to this end. The resolution recites:

> *Whereas*, the great rivers of Missouri, the natural highways for commerce, if properly cared for by the National Government, would be the means of saving millions of dollars in freight rates to the people of Missouri and adjacent territory; and,
>
> *Whereas*, the appropriations that have been made heretofore by Congress have been so meager that the practical benefits arising from such appropriations are undiscernible; and,
>
> *Whereas*, the exigencies of the times require the National Government to take charge of this matter; therefore, be it
>
> *Resolved*, That the United States senators and members of Congress from Missouri be urgently requested, one and all, to use their utmost endeavors to secure sufficient appropriations by the Federal Government for the improvement, navigation, and maintenance of said rivers for the uses and purposes of commerce.

The House of Representatives followed up this resolution by appropriating $5,000 for a waterways commission to obtain data regarding navigable rivers, overflowed lands, proposed levees, and such information as will facilitate legislation to assist deep-water projects. Members of the commission are to be appointed by the governor.

Regarding this action the *Kansas City Star* says editorially:

> The action is in keeping with the progressive and enterprising spirit of the times and is in pursuance of the recommendations of the National Rivers and Harbors Congress.
>
> The amazing thing is that members of Congress should need the greatest reinforcement that may be brought to bear on them to take action in favor of waterways improvement when the merits of the proposition are so manifest and overwhelming. It is said that within a few years the railroads of this country will spend $5,000,000,000 in improvements in order to keep pace with the country, and Mr. James J. Hill declares that even with this expenditure the pace cannot be kept. Yet the Government hesitates to authorize the issuance of 500 millions in bonds, at the rate of fifty millions a year, to improve its inland waterways, when these waterways, with only a small proportion of their capacity in use, already carry nearly one-third of the tonnage and at a cost of about one twenty-third of the cost of rail shipment.

State Parks

AMONG the many good things promoted by the American Civic Association is the establishment of state parks. America is familiar with the idea of the national parks, splendid examples being afforded by the Yellowstone and Yosemite. We are likewise familiar with city parks, such as the Central, in New York City, Lincoln, Jackson, Garfield and the like in Chicago, and the Public Gardens in Boston, but the idea of a state park seems somewhat apart from the thought of our people.

True, certain states, as Massachusetts, New York, California, Pennsylvania, and New Jersey, do maintain state parks, yet the large majority of states do not, and in most of them the proposal to establish such parks has probably never been agitated.

But why should not the park be as regular a feature of the state as of the city? In many of our states are found magnificent examples of scenic beauty which, through lack of state ownership, suffer from neglect if not from devastation. These should be preserved as a part of the permanent heritage of the people. Again, recreation, contact with nature and familiarity with her beauty contribute materially to the health and well being, physically, mentally, morally and spiritually, of a people. In times of rush and drive, such as those in which most of us are now living, they are almost essential to complete sanity. The remoteness of our great national parks renders them inaccessible to most. The state parks might well supply the needs of many of these dwellers in country districts and in villages far removed from these recreation grounds, and at the same time out of convenient reach of the city.

It is a curious fact that, beginning as did all our states, both north and south, with exaggerated ideas of the place and power of the state as compared with the Nation, a surprising number of things that, to the great advantage of their inhabitants, our states might do without stretching their powers, have been left undone. It will be recalled that Secretary Root, some two years since, called attention to this fact. In very many important respects the powers of an American state are almost or quite equal to those of a European state; and yet, so impressed have we become with the majesty and might of the Nation, that state powers, obvious and fundamental, are, in numerous instances, but slightly used if used at all.

It is true that, within the last two years, many of our states have materially increased their activities. Examples are found in their treatment of corporations and, notably, in their interest, beginning a year ago, in the great conservation movement so auspiciously opened with the White House Conference. Subsequent events have demonstrated the readiness of several states to act along conservation lines. It is to be hoped that one of the measures to receive earnest and careful attention from the states will be the establishment of public parks.

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Towns without Taxes

IN OUR news columns appears an item on the "immense profits of German forests." Numerous towns and cities maintain large holdings, Baden having 10,576 acres, yielding an annual net profit of $66,080, or approximately $6.25 an acre, Freiburg having 8,085 acres, yielding a net profit of $46,336, or $5.79 an acre, and Heidelburg, 6,860 acres the clear profit on which each year is $12,635. The village of Aufen, with 220 inhabitants, has 163 acres of timberlands, the proceeds from which suffice for all the expenses of the little community.

In the village of Braunlingen, which has 1,601 inhabitants and 4,507 acres of forests, there is an allowance to the citizens of firewood and 100,000 board-feet of lumber is given to churches, schools, and other public institutions. From the timber sold, the net income is $21,600,

and Braunlingen not only is free from all communal taxes, but is enabled to establish electric plants, water-works, and other public improvements.

In FORESTRY AND IRRIGATION for September, 1907 (pages 446 and 447) was published a clipping from the London, England, *Bystander,* regarding the town of Faleide, Norway, of which it was said: "The town of Faleide, Norway, imposes no taxes on its lucky inhabitants. During the last thirty years the authorities of Faleide have sold over $5,000,000 worth of trees; and, by judicious replanting, have provided for a similar income every thirty years. In consequence of this source of commercial wealth, there are no taxes in Faleide, and local railways and telephones are free, as well as education—and drinks upon the king's birthday."

There is a proverb in the United States that two things are inevitable, namely, "death and taxes." The cases of Braunlingen, Faleide, and the other towns named above, appear to be exceptions. In commenting upon the Faleide situation, FORESTRY AND IRRIGATION called attention to sources of municipal income, aside from the taxpayer's pocket, in other towns than those named. Ancient Athens derived a substantial revenue from her silver mines at Laurium. The town of Fairhope, Ala., owns a wharf, fees for the use of which constitute a valuable source of revenue for the village. The city of Chicago still owns her sixteenth section, set apart for school purposes, from the rentals of which the city derives a splendid annual revenue.

America is coming to realize that there is money in wood. As this fact, however, is borne in upon her more strongly through the progressive depletion of our timber supply and the consequent enhancement in price of all wood products, why may not American cities and towns emulate the example of the European towns above mentioned, buy up cheap lands in the neighborhood of their limits, maintain them in forests managed according to forestry principles, and sell the annual product, to the material advantage of their municipal treasuries?

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Public Activity Plus Private

FROM Colorado comes an interesting story of private enterprise. A cowboy becomes a great irrigator.

Some ten years ago officers of the U. S. Geological Survey were surveying the raw prairie in Otero County. A cowboy spent the night with them, became interested, stayed with them a few days and told them what he knew of the country. They, in return, showed him one of the best reservoir sites in the country, and told him how water could be had and what territory it might irrigate.

The cowboy took the hint. For ten years he nursed his project, surmounted difficulties without number, organized a company and at last succeeded. To-day the works are finished. The dam of one reservoir contains 303,000 cubic yards, and that of another 155,000. The lateral canals are twenty-two miles long. The reservoirs will irrigate 10,000 acres of land. Water is now running into them, and farmers are ploughing all over the district.

"But," inquires one, "why private irrigation? Have we not a great national irrigation service? Has not Uncle Sam taken up this work of redeeming the desert? Why should he not carry it through to the end? Is not private irrigation reactionary and individualistic? Will it not lead to abuses, and result in the long run in more harm than good?"

These questions are exactly on a par with questions once, at least, raised by an opposing school of thought. "Why," they asked, "should government take up work of this kind? Is it not thereby transcending its functions? Is it not invading the field of private initiative and narrowing the opportunity for individual freedom? Is it not erecting a bureaucracy upon the ruins of a republic, sanctioning 'the great political superstí-

tion' and paving the way for 'the coming slavery?' "

However wise the men who have propounded these two sets of questions, the questions themselves are by no means profound. The opposing viewpoints from which they proceed are equally superficial. No one but the doctrinaire nowadays insists either that the Government shall do everything in the field of industry, or that it shall do nothing at all. On the one hand, it is clear, as set forth many years since in the Encyclopedia Britannica by a distinguished British economist, that "out of the mere conflict of private interests can never come the well ordered commonwealth of labor." Sore experience has taught the civilized world that to leave all industry to unregulated private activities is to open a Pandora's box of ills. On the other hand, no country, with the possible exception of Ancient Peru, has ever yet attempted the other extreme of turning all industry over to government; nor, so far as can be judged, is any country likely soon, if ever, to do so.

In public affairs, as in private, common sense exercises an influence which, in the long run, usually proves dominant. We now know that it does not square with sound common sense to leave individuals and corporations to do absolutely as they please in business. On the other hand, common sense sees no reason for turning all business over to government. In the matter of irrigation, for example, the reason for not doing so is clear. We have an arid area which, not long since, was greater than the entire Roman Empire. Our Government is not ready to undertake, alone, the task of reclaiming this vast region. It has not the funds available. There is not the public demand that it shall perform the entire work. To be economical, its efforts must ordinarily be conducted on a large scale. Yet operations on a small scale are likewise necessary. To handle these, individuals and companies are often far better adapted than is a great government. Again, governments are proverbially slow of movement. While they are merely pondering the question of policy, and wondering whether to strike out on a new line years may elapse during which important interests will suffer. Individuals, however, if interested, can move quickly. Under the joint stock system, to-day so common, or under some form of group cooperation, funds from many sources can promptly be brought together into a single considerable fund, and projects of appropriate magnitude launched and carried through to success before government will have even made up its mind whether to act or not.

In the present stage of industrial development, and possibly for many years to come, it seems probable that the general good will be best served through the participation in industry of both private individuals and government. The two are complementary. The one supplies the place which the other leaves vacant. Each can learn from the other and each can, in some respects, stimulate the other to good works.

How far the present tendency toward public ownership and administration may be carried, and to what extent it will limit private initiative, it may be difficult to forecast. Throughout the world, an extraordinary drift toward increase in governmental activities is clearly discernible. Nevertheless, to infer that because governments are increasing their activities they will continue to do so until they have absorbed all industry is as logical as to assume that, because one for a time has been walking northwards, he will not stop until he has reached the north pole; or, because an infant is growing, it must necessarily continue to grow until it has exceeded the size of the Brobdingnagians of Gulliver's Travels. As stated, communities and nations, like individuals, learn by experience. Experience has taught the civilized world that government must go into business in certain fields for

certain objects and under certain limitations. Experience likewise may be relied upon to teach us how far it should go. Should it go too far, there is always the possibility, under popular control, for it to retrace its steps.

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Prosperity to Be Genuine Must Be General

IN OUR news columns are references to the marked increase in investments in water transportation. The editorial from the *Wall Street Journal*, there quoted, ends with the paragraph:

"No threat to our railroad development as a whole is implied. Such water facilities in fact have usually brought more new business to the railroads than they have taken away."

In these few lines is recognized a great principle too little understood. To far too great an extent the old maxim has prevailed that "One man's gain is another's loss." As a matter of fact no proposition could be found more baseless in philosophy. To an increasing degree we are coming to see that the same principle is unsound in business. Reference is made in these columns to the old-time fight of railroads against waterways. Happily, this hostility is passing. Such representative railway men as President James J. Hill and W. W. Finley do not hesitate to declare in public that the railways, instead of opposing the development of our internal waterways, with the accompanying increase in transportation facilities, welcome this movement as helpful, not simply to shippers or to the country at large, but to the railways themselves.

In a very fundamental sense individuals, industries, communities, and nations rise or fall together. A genuinely good thing is good not simply for one, but for all. A gain derived at the expense of others is factitious, specious, ephemeral, a will-o'-the-wisp.

That this principle applies to nations was emphasized by President Roosevelt in his address to the North American Conference on the Conservation of Natural Resources when he said, "The ablest man will do best where his neighbors also do well. It is just so with nations. In international relations the great feature of the growth of the last century has been the gradual recognition of the fact that instead of it being normally the interest of one nation to see another depressed, it is normally the interest of each nation to see the others elevated."

One of the strongest and most striking pieces of work ever done by Mr. Herbert Spencer was the demonstration in his "Principles of Sociology" that society is organic, that its members are parts of a living whole, and interdependent. Let this principle once be recognized and far-reaching conclusions will flow therefrom, not the least important of which is that all should welcome a good thing and help to push it along, conscious that, whether we see it or not, the real good which comes to one will be diffused throughout the community, yielding, directly or indirectly and sooner or later its blessings to all.

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New Jersey Protects Woodlands

BY AN act approved April 12, New Jersey has provided for the protection of the woodlands of the state. The act provides that wherever in the state woodland adjoins the right of way less than 110 feet from the roadbed of a railroad whose locomotives consume coal or wood, a fire line shall be constructed.

At a distance not less than 100 feet, nor more than 200, from the outer rail on each side the track, and parallel with the track, a ten-foot strip of land shall be entirely cleared of combustible matter. Where the land is swampy, a ditch three feet wide dug to the permanent water level may replace the bared strip. From between this strip or ditch and the roadbed all combustible materials must be removed, except that standing trees above three inches in diameter and not less than six feet apart

may be pruned rather than felled. Standing trees must be not less than six feet apart.

The Forest Park Reservation Commission is made the administrative body, with power to authorize the omission of a fire line or to enforce the construction of such lines, the decision of the commission in all such cases being final.

Copies of this act may be obtained from Mr. Alfred Gaskill, Forester, Trenton, N. J., and may well serve as the basis of similar legislation in other states where fires are frequently kindled by sparks or hot cinders from locomotives. The lessons taught by the experiences of recent years, notably of last fall, regarding damages from forest fires thus kindled should not be forgotten. If they lead, as they are apparently leading in New Jersey, to the enactment and enforcement of appropriate protective legislation the great loss resulting from these fires may, in part at least, in the future be compensated.

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Waste of Resources Due to Fire

AT THE recent joint meeting of four great national engineering societies held in New York City, Mr. Charles Whiting Baker spoke from an engineer's standpoint of the meaning of the continuous waste of property due to fire. His paper, as published in *Insurance Engineering* for April, deserves a résumé.

The fire losses of the United States for 1907 totaled $215,000,000. About half this loss was upon buildings burned or injured; the other half was upon contents. One thousand four hundred persons lost their lives in fires and 5,650 were injured. These fires occurred in 165,250 buildings, and the average damage to each building and its contents was $1,667. In addition to these direct losses by fires were indirect losses, as through interruption to business, maintenance of fire departments, insurance companies, etc.

To comprehend the magnitude of this fire loss, Mr. Baker asks us to picture a city street, on lots with an average frontage of sixty-five feet, and with buildings placed closely together. This street would be a thousand miles long, and would reach from New York City to Chicago. At every thousand feet would be found the ruins of a building from which an injured person was rescued; at every three-quarters of a mile, the blackened wreck of a house in which some one was burned to death.

Let this fire begin on January 1 and be driven by a high wind; eating its way forward at a rate of nearly three miles a day, it would have to burn for a year before consuming the entire double row of buildings. On finishing this street at midnight on December 31, 1907, it would immediately begin upon a second, similar street, burning it throughout the entire year of 1908.

Nor is this the showing for an exceptionally bad year. "The statistics of fire losses gathered for many years by the National Board of Fire Underwriters show that the annual fire loss has been steadily increasing." In the ten years ending with 1887, the annual loss averaged $92,000,000; in the ten years ending with 1897, it averaged $132,000,000; and, in the following decade, $203,000,000.

Let us compare our fire loss with that of European countries. The losses for the people of the United States in 1907 "represented an annual per capita tax of $2.50 on every man, woman and child in the population," or $15 on every head of a family of six persons. The per capita fire loss in the principal European countries reads: Italy, 12 cents; France, 30 cents; Austria, 29 cents; Germany, 49 cents. "It is only in Russia and Norway, where wooden buildings form a considerable portion of the whole, that the fire loss per capita approaches even half of our own per capita rate."

A chief cause of this loss Mr. Baker finds in the disposition of our people, including our engineers, to "run on in a rut." Wooden buildings were once

cheapest; hence we conclude that they are still cheapest; we, therefore, still build them and permit them to ascend in smoke.

Says Mr. Baker: "I do not overstate the case when I say that our American cities and villages are made up almost wholly of fire-trap buildings. We have lagged far behind in our adoption of better and safer methods of building construction. We must, for at least a generation to come, pay the penalty of heavy charges for fire protection, heavy insurance rates, heavy fire losses. And we must continue to bear this heavy tax until we rebuild our cities with fire-resisting structures."

Mr. Baker points to new building materials, and says: "It was the circular saw and the railway that created cheap timber throughout the nineteenth century, and housed the people of the United States in cheaply built and easily burned wooden buildings. It is the rotary kiln for burning Portland cement, the rock drill, the brick press and a thousand other modern inventions that are to create the incombustible buildings which the twentieth century is to construct."

Mr. Baker points out that not only the buildings, but their contents, must be protected, and commends the work accomplished by the factory mutual insurance companies of New England. These companies, insuring chiefly mills which handle cotton, have reduced the rate of loss to about 5 cents per annum for a hundred dollars insured, "a rate of loss little more than a tenth, probably, of the average fire loss on all classes of buildings in the United States."

Mr. Baker next indicates the losses due to forest fires, especially those of September and October last, and aptly says: "What I most want to make clear to you is that unless and until you create in every forest state of the Union effective laws and effective organizations to prevent forest fires—unless and until you do that thing—all our talk of conserving the forests is vain. We cannot get away from economic laws. We cannot expect a man to preserve valuable woodlands uncut when a forest fire may at any time wipe out the property entirely. And the higher the price of lumber goes, the greater the inducement to cut off the trees."

In closing, Mr. Baker points out the connection between the losses due to the burning of buildings and their contents and the general question of conservation. He says: "It is just as much of a drain on the forests to burn up the boards and the timber in a house which must be rebuilt as to burn up the trees before they are cut down and sawed. And not only timber but iron, tin, lead, zinc—all the materials used in building construction and a vast amount of merchandise contained in buildings is devoured annually by the flames." Clearly, the prevention of this waste is an end which may properly enlist the interest and effort of every friend of the conservation of natural resources.

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What Shall We Do about It?

REFERRING to the editorial in CONSERVATION for May entitled: "How It Is Done," a friend of conservation, himself a lumberman, writes:

An article of this character, in my opinion, is calculated to do great damage to forest conservation. First, it antagonizes and in a measure destroys the better judgment and sympathy that lumber operators have relating to forest conservation. Second, it creates in the minds of people who have not studied the question the opinion that the lumbermen of the country differ only in acts from pirates in that the work that they do is not at present punishable under the law. Of the two results of articles of this kind, if persistently published, I think the last result cited, inflaming the public mind against the lumbermen, will be the more harmful for the reason that the public mind will become crystallized to a line of action or laws that will be aimed to punish the lumbermen rather than to conserve the forests. I might incidentally remark that the lumbermen now are getting about all of the punishment they can bear.

A little farther over in the magazine, on page 295, editorially, is an article entitled "The Community Must Care for Itself." This article seems to me to be nearer the

line of thought that the public must be educated to in conservation. It is unfair to ask the individual to take on and carry any scheme of practical conservation as an individual proposition. While it is eminently fair that the individual should contribute his fair share as an individual, the community must also contribute its share. This one thought, it seems to me, if persistently brought to the public mind, will crystallize public thought so that they will be willing to adopt some practical scheme of conservation. I am of the opinion that any national law affecting conservation that would affect the individual owners of forest areas alike, would find more advocates among the individual forest owners than would oppose it. The community would, of course, be compelled to contribute its share by paying the increased cost of production.

CONSERVATION appreciates the compliment the writer pays by frankly describing the situation as he sees it. As in the second editorial referred to, this publication has uniformly held and taught that the responsibility for forest destruction rests chiefly not on the individual but on the community, and that a condition which a daily growing number is coming to deplore is traceable chiefly not to the "greed" of the one, but to the ignorance and indifference of the many.

CONSERVATION recognizes that no one better knows the nature and needs of the woods than does the lumberman, and that many of the more progressive lumbermen are ready and eager to apply to their holdings those well-established principles of forestry which, in the long run, are best—not only for the people as a whole, but also for the woods and for those whose business it is to harvest the woods. This publication is aware, however, that in a large class of cases those who would thus apply these principles are restrained from so doing partly by competitors who are not ready to do likewise and partly by a public which will not require lumbermen in general to improve their methods.

It is a hopeful sign that, notwithstanding these embarrassments, there is on record a large number of cases in which lumber concerns have sought advice in the matter of better methods, while a smaller number have actually acted upon this advice. Yet, by the best testimony available there remain, under present policies, but some thirty-three years of life to the timber supply of the United States. In view of this fact and of the consequences which must flow therefrom, CONSERVATION earnestly invites expressions of opinion from lumbermen as to the actual, practical solution. The problem is before us; what shall we do about it?

NEWS AND NOTES

Good Words for Conservation

Words of appreciation for CONSERVATION are pouring in. Ex-Governor Guild writes from Boston regarding the May number: "The last copy of the magazine is the best, I think, ever issued; and I am particularly pleased with the papers of Mr. Bailey Willis and the illustrations."

Then, again, State Forester F. W. Rane, of Massachusetts, puts his views in a nutshell. He says: "May is a great number. Congratulations."

Setting an Example

Ex-Governor Pennypacker is about to plant ten acres with forest trees on his farm as an example to surrounding farmers.

Senator Root Planting Trees

A writer in the *Utica Observer* furnishes a table of the persons who have planted trees in Oneida County this year, and the number each has planted. The total is 86,000. Of these Hon. Elihu Root, of Clinton, planted 64,000, or nearly three-fourths of all. Of his trees, 31,000 were obtained from the Forest, Fish and Game Commission, and the remainder came from the nurseries of other states and Europe. The following are the three varieties and the number of each which he is actually planting: White pine, 16,400; Norway spruce, 15,200; red pine, 5,200; red oak, 6,000; black locust, 5,200; chestnut, 5,000; basswood, 5,200; white ash, 6,000.

Progress in Massachusetts

The office of the Superintendent for Suppressing the Gypsy and Brown-tail Moths, by an act of the legislature of Massachusetts, has been combined with the office of State Forester under the title of the latter. Governor Draper and his council appointed F. W. Rane to the new position on April 14, at a salary of $5,000. The office of State Forester has been moved from the State House to No. 6 Beacon Street, Boston, Mass.

Conservation in Rhode Island

The act providing for a survey of the natural resources of the state passed both branches of the general assembly last night. The work is to be done under the direction of the Commissioner of Industrial Statistics, George H. Webb, in cooperation with the Rhode Island State College and the Federal Government.

Colonel Webb will appoint as the agent to make the survey Charles W. Brown, assistant professor of geology at Brown University.

Conservation in Arkansas

The Arkansas Conservation Commission, recently appointed by Gov. George W. Donaghey, held its first formal meeting on April 21, and effected a permanent organization by the election of Governor Donaghey, chairman, and Sid B. Redding, secretary.

Letters were read from the officials of the National Conservation Commission and from the Joint Committee on Conservation, urging the Arkansas body to begin effective work and requesting that the new state association cooperate with the national organization.

Correspondence was presented from nearly every state in the Union, including various governors and state conservation officials, advising of the progress of the movement in different states and offering suggestions concerning the work.

The governor appointed a special committee to draft a report with suggestions as to the lines on which the commission shall proceed, following which the commission adjourned to meet again in about sixty days.

What Illinois Women Want

In renewing its activities, the Illinois Federation of Women has adopted this platform of things to be accomplished:

"A concerted fight against billboard advertising.

"A movement to establish public comfort stations in the cities of Illinois.

"An investigation of the treatment and care of dependent and delinquent girls in the state.

"A state campaign for a sane Fourth of July.

"A movement to secure a woman physician in every public institution where there are women inmates.

"A campaign to secure the pine woods of Ogle County as a state forest reserve.

"A campaign for the passage of the Eastern Forest Reserve bill, establishing a reserve in the Appalachians and White Mountains.

"An effort to secure women's dormitories at the University of Illinois."

The Ogle County White Pines

Illinois clubwomen are pushing a bill which has for its aim the protection of the slim woodland resources of Illinois. This bill calls for the purchase and reservation by the state of the famous "Ogle County white-pine forest," to be under the administration of a proposed forestry board.

As a rich prairie and farming community, the state cannot afford to part with the few remnants of natural beauty that remain to her. The pine woods of Ogle County, less than 100 miles from Chicago, like Starved Rock, belong to her ancient history. In this 500 acres is to be found part of the original forest of white pine which at one time stretched north into the greater forests that grew about the Great Lakes.

The trees represent the southern limits of their species and have dignity in the eyes of botanists and students of natural history as the last of a splendid army of evergreens, now strangers and unknown to the present generation who till farms over the areas once covered by large forests.

The forest is of that character dear to the botanist and bird lover. At the southern end is a fine growth of young pines, and along the east bank of the creek are the red, white, bur, scarlet and chinquapin oak, white and slippery elm, large-tooth aspen, black walnut, butternut, shagbark, pignut, mockernut hickory, sycamore, hackberry, white and black ash, black and choke cherry, wild plum, basswood, hoptree, black willow, and June berry.

A great variety of blooming plants, vines, and shrubs make the woodlands beautiful at all seasons of the year.

State Parks Win Public Favor

One of the most important projects advocated by the American Civic Association is that of state parks—the purchase and control by the states of areas comparatively extensive which would afford recreation grounds for the citizens and, at the same time, conserve the natural resources and natural beauty of scenery possessed by every commonwealth.

The State of Wisconsin has begun action along this line, having undertaken an examination and appraisement of its resources with a view to setting aside parks. The handling of this work has been entrusted to a board consisting of Messrs. T. E. Brittingham, E. E. Browne, and W. H. McFetridge, assisted by Mr. John Nolen, a landscape artist of national reputation and a member of the executive board of the American Civic Association. While Mr. Nolen's report dealt especially with four prospective Wisconsin state parks, its general suggestions are of universal application. First of all, Mr. Nolen expressed the wisdom of prompt action by the states "while the property desired can be purchased at a reasonable figure and at a price which would prove an excellent investment from a purely money viewpoint." As to the object of state parks, he said that they should be selected with a view to conserve natural resources and natural beauty of scenery.

"There are thousands of persons in every section of the country in need and in search of the wild and beautiful places of nature, and in almost every state of the Union there are places fitted to supply their need and reward their search. It would seem like a clear case of demand and supply. Most of these places are not of such a character as to form national parks, nor are they so situated as to serve the needs of a single city. The result is, that they either are being ruthlessly destroyed or are gradually drifting into private possession for purely private uses."

Mr. Nolen referred to the several state parks maintained, in a restricted way, by Massachusetts, New York, California, Pennsylvania, New Jersey, and a few other states, and then, discussing the general requirements, he said, in substance:

"The main purpose of state parks is to refresh and strengthen and renew tired persons, to fit them for the common round of daily life. They should be large to accommodate great numbers, 2,000 or 3,000 to 5,000 acres. They should be accessible, within a reasonable distance, and at a reasonable cost. Air and climate should be salubrious, and the situation should be healthful. The property acquired should be reasonable in cost; seldom would a state be justified in paying more than $100 an acre for land, and $25 has been the average price. They should be 'natural' stretches of land of intrinsic beauty. They should be of uncommon beauty, a distinction among landscapes, an irresistible appeal to the nature lover."

In justification of the investment of state money in such parks, Mr. Nolen said, regarding Wisconsin, but of equal force as to other states:

"State parks would, in common with the forest reservations—the great economic value of which is now unquestioned—preserve and

protect just so much more of the woodland of the state and the stream flow dependent upon it. They would provide the best method of preserving places of historical and scientific interest. They would secure a necessity of modern life before it is too late.

"State parks would give an economic return from tourists and visitors.

"State parks are the only means of preserving, protecting, and appropriately improving places of uncommon and characteristic beauty.

"Finally, these parks would make, as no other agency can, adequate and permanent provision for wholesome out-door recreation and pleasure.

"If it is right for the state of Wisconsin to spend $1,250,000 upon charitable and penal institutions, as it did in 1908, made necessary in part at least by unfavorable physical and social conditions, is it not wise and good to spend something upon preventive measures which would make such institutions less necessary? Who questions nowadays that simple recreation in the open air amid beautiful natural surroundings contributes to physical and moral health, to a saner and happier life? These parks are the only security that the future holds out for persons of small means."

Immense Profits of German Forests

In view of the general interest in municipal or communal forests, as advocated in this country by the American Civic Association, the report obtained by S. B. Elliott, of the Pennsylvania Forestry Reserve Commission, concerning the practical value of such woodlands in Germany is a remarkable document. This shows the actual profits obtainable from public forests.

There are 1,342,944 acres of forests in Baden, which state has a total area of 3,726,665 acres. Of the wooded lands, 577,465 are owned by communities and corporations. In Baden, 1,350 of the 1,564 communities have forests and, in addition, 287 schools, churches, hospitals, and other similar corporations are engaged in practical forestry. From these public forests there are allowed to be cut yearly 261,724,300 board-feet of timber, which has a value of $3,600,000 free of expense of cutting.

As an instance of the communal forests, the city of Baden has 10,576 acres, the income from which is $100,471, as against an outlay of $33,391, so that the net profit is $66,080, or approximately $6.25 an acre. In Freiburg, the forests cover 8085 acres, representing a total income of $84,166, with an outlay of $37,330, or a profit of $46,836, or $5.79 an acre. In Heidelberg, the forests cover 6860 acres. The income is $39,834 and the outlay $27,199, showing a profit of $12635. Heidelberg still is acquiring land, and that expense necessarily reduces its net income.

In the village of Braunlingen, which has 1,601 inhabitants and 4,507 acres of forests, there is an allowance to the citizens of firewood and 100,000 board-feet of lumber is given to churches, schools, and other public institutions. From the timber sold, the net income is $21,600, and Braunlingen not only is free from all communal taxes, but is enabled to establish electric plants, waterworks, and other public improvements.

Even in the village of Aufen, with only 220 inhabitants, there are 163 acres of timberlands. This gives 2,000 board-feet of firewood to each citizen, and the 85,000 board-feet of timber sold nets more than $1,400, which is sufficient for all expenses of the little community.

These advantages of public forests could be multiplied to the number of every community having them. According to the latest report, the various German states having productive communal forests are: Prussia, 6,309,109 acres; Bavaria, 2,041,450 acres; Wuertemberg, 466,203 acres; Alsace-Lorraine, 373,417 acres; Baden (domains), 239,896 acres; Hessia (state and domains), 177,923 acres; Prussian Crown, 165,492 acres; and Fuerstenberg, 74,493 acres.

In Hessia, forests are being planted upon land hitherto devoted to agriculture.

The Biltmore Fires

Dr. C. A. Schenck, Director, Biltmore Forest School, writes:

"As regards the forest fires at Biltmore, I am glad to say that the newspaper reports have been exaggerated. Only two acres of my plantations were destroyed; 12,000 acres of primeval forests were run over by fire, and, naturally, the young growth was annihilated.

"By many years' protection, the vegetable mold on the ground had accumulated, and a dense stand of young growth had been produced. Both are gone. * * * All our fires were of incendiary origin."

Yale Forestry Students in Texas

A Yale party consisting of two professors and twenty-nine senior students is in Texas studying forestry. Says the *Somerville* (Mass.) *Reporter:*

"The party is in the east Texas yellow-pine district, encamped in the thickest of the timber territory, in the very jungles of pine, and in the last term of their course in the Yale Forestry School, though they are far from New Haven, they are doing full work daily and getting credit for it, and will graduate in June with just as much effect to the diplomas as the B.A.'s and the LL.B.'s and the B.D.'s and the other fellows in cap and gown and marching processions who

finish their course with all the ceremony and display of the commencement occasion."

The party came on the invitation of Mr. J. Lewis Thompson, of the Thompson Bros. Lumber Co. Mr. Thompson provided a cabin containing bunks for the entire party. The students, however, preferred tenting outside.

The *Reporter* continues:

"'Better'n New Haven,' is the way one of the foresters described the eating. Probably the fare isn't any better, maybe not as good; but the exercise in the woods, the open air, and the pine-scented atmosphere and the clear sunshine, and a score of other features, all have influence combined to create wonderful appetitites, and the joy bell at the mess hall never fails to bring unanimous response."

American Pomological Meeting

The executive committee of the American Pomological Society, a national organization, has accepted a joint invitation tendered by the Ontario Fruit Growers' Association, the Niagara District Fruit Growers, and the St. Catherines Horticultural Society to meet at the city of St. Catherines, Ontario, Canada, September 14-16, 1909.

The secretary of the general executive committee is Mr. P. W. Hodgetts, of Toronto. The secretary reports that an unusually large number of state horticultural societies have appointed delegates to attend the meeting. This will insure a wide representation and a diversity of interest which will present exceptional opportunity for considering in a satisfactory way legislative questions of interstate significance. A great exhibition of Canadian-grown Lake Ontario fruits will be in progress at the time of the meeting.

The fruit region between Niagara and Toronto is the most intensively cultivated region in Canada. Excursions through this famous section will be arranged for the pleasure and profit of the visitors.

The program may be expected to include the latest and best in the entire field of pomology.

Remember the Raisin!

The interest of much of the United States has been centered upon California Raisin Day, April 30, as a result of the determined and systematic campaign being carried on by the raisin growers of the Golden State to convince the people of this country that raisins are not only an article of dessert to be used on rare and state occasions such as Thanksgiving and Christmas, but an every-day, staple article of food. When one pauses to consider that a pound of raisins is equal in food value to nearly a pound and a half of beef, as shown by United States Government analysis, it is a matter of wonder that raisins have not long ago become a part of the daily food of the people. This fact has been recognized for hundreds of years by the people of European countries, where the consumption of raisins per capita is about five or six times greater than in America.

From all indications, the growers will succeed in their endeavor to bring the heretofore unrecognized raisin into its own as a cheap, popular food for all the people, as no more nutritious and nourishing fruit exists.

The Counties Committee at Work

A special train containing over 100 delegates from various commercial bodies of San Francisco and northern counties left on May 7 for Del Monte, where representatives of all the other counties of the state were waiting for the opening of the convention at nine-thirty on the morning of the 8th. The one great topic to be considered was the conservation of the natural resources of California, this being the first state-wide movement instituted anywhere in the country for such a purpose. The conservation of the natural resources of California was the subject-matter of resolutions, reports and addresses. Delegates from sixty-three affiliated organizations assembled in the art room of the Hotel Del Monte to plan new steps in the cooperative movement that has proved so far-reaching in the upbuilding of the Golden State.

Among the results of the deliberations were unanimous endorsement of the proposed $18,000,000 bond issue for the improvement of the state's highways; the signing of a petition to the National Government for the opening of Yosemite Park to automobiles, and the endorsement of suggestions for highway tree-planting and the conservation of forest areas.

Resolutions were adopted praising the conservation policy of the Federal Government; endorsing the plan proposed by the Rivers and Harbors Congress for the issuance of Government bonds for the improvement of navigable rivers; endorsing the Federal Government's action in reducing the charges upon electric power developed by the use of stored water; thanking Congress and the state legislature for appropriations made in aid of the viticultural industry, and endorsing the work of the United States Weather Bureau.

Utilizing a Volcano

An American in Hawaii has discovered a new use for a cheap and common article, and a new way of preparing it. The article is the giant fern, and the method of preparing it is to cook it over a volcanic crack,

after which it becomes a highly acceptable object of diet for hogs.

Peter Lee, an American, has a ranch right on the edge of the great crater of Kilauea, on the Island of Hawaii, some 200 miles from Honolulu. All about the tremendous cauldron of nature spread dense forests for many miles down the easy slope of the mountain's sides. Very much of this tangle of vegetation is made up of great tree ferns, many of which tower fifty feet or more in the air, like great feather dusters. The great trunk or stem of this fern, frequently a foot or more in diameter, is composed of a pulpy, fibrous mass enclosed in a hairy harder covering. Peter Lee discovered that this pulp contains a large amount of starches and sugars, and that by steaming or cooking these are rendered soft, and are greedily eaten by the hogs.

In many places about the volcano, sometimes several miles from the active central pit, cracks have formed in the hardened lava surface which covers the whole mountain, and from these fissures heat and steam perpetually escape. To construct a gridiron over one of these heat cracks, and to pile upon it the fern-trunks, cut into cord-wood lengths, was the acme of simplicity and effectiveness. In the course of a few days the steam has thoroughly softened and cooked the ferns, and all that remains to do is to split each stem with an ax, when the swine will devour them voraciously.

Dr. E. V. Wilcox, director of the Hawaii Experiment Station, believes that Hawaii's ferns may come to be of considerable economic importance as a stock food. Fern roots have had some value in this line in some parts of the Northwest, where the growth is comparatively scanty, and if the food value of Hawaiian ferns prove as high, large tracts of forest land are likely to acquire a new value.

Mr. Newell's Visit to Hawaii

In the Fifth Report of the Board of Commissioners of Agriculture and Forestry of the Territory of Hawaii occurs this paragraph, which, in view of Mr. Newell's long and important connection with the American Forestry Association, should be of especial interest to the readers of CONSERVATION:

"The event of greatest importance in conservation matters in Hawaii during 1908 was unquestionably the visit to the islands in the autumn months of Hon. F. H. Newell, Director of the United States Reclamation Service. Following almost immediately Secretary Garfield's return to the mainland, it shows that Hawaii's claims for recognition are not only being heard but responded to from Washington. Already Mr. Newell has been of signal assistance to the territory in getting the plans for a hydrographic survey definitely under way. The coming year will see no small development along that line. All of which leads to making Hawaii a better place to live in and consequently to its development as a true American community.

"At the invitation of the governor, the Superintendent of Forestry accompanied Governor Frear and Mr. Newell on a portion of their tour of the other islands, going with the party to Molokai and Kauai. On these trips it was possible to discuss with Mr. Newell a number of forest problems on the ground. Needless to say, many valuable suggestions was one result of these informal conferences."

Conservation in Hawaii

On March 1 last the Governor of Hawaii and his conferees who attended the Governors' Conference in Washington last May appeared before the Hawaiian legislature and delivered a series of addresses. From these extracts are taken. Gov. Walter F. Frear said, among other things:

"Congress in general believes in helping states and territories that help themselves. It is now helping us in many ways. It is beginning to help us in the matter of forests, which is one of our most important natural resources, not merely for the purpose of the timber, but mainly for the purpose of conserving the water, for purposes of irrigation and power and domestic use. We need to experiment with a view to obtaining new varieties of trees which will be good for timber and which will grow at our high elevations, particularly where now scarcely anything will grow."

Mr. Ralph S. Hosmer, Superintendent of Forestry, and chairman of the Territorial Conservation Commission, says, in part:

"Fortunately, on the windward side of the islands there are numerous streams, which, with the artesian water in other places, are sufficient to supply most of the needs for water if the forests and the streams are handled in a judicious manner. Because of the steep, short water-sheds, it is essential that there be maintained a cover of vegetation on the catchment basins of the water-sheds. Without such a cover of vegetation, the water quickly runs away, not only being lost to human use, but doing considerable damage through the erosion of the upper parts of the valleys and the flooding of valuable lands below. The Hawaiian forest is admirably adapted to act as a protective cover on the water-sheds. When the water-shed is covered with vegetation the dense tangle of trees, shrubs, vines, ferns, and moss retards the run-off, prevents erosion and stores up the rainfall. The water is then gradually given out to feed the springs and streams, which results in a fairly constant flow. The native forest is the best possible cover for the water-shed. Consequently, in view of the value of water to

the territory, the only wise course is to protect the forest cover on all the streams that are or may be needed for economic use. The preservation of the forest saves the waters. The assurance of a dependable supply makes possible the development of land that could not otherwise be turned to useful account. In Hawaii, lands, waters and forests are interdependent, so that a policy of conservation is essential.

"The Hawaiian forest is easily damaged from fire, cattle, and from other causes, and it is essential in order to get the best results that the forests be protected. That the forests may be better protected and more easily handled to the end that the waters they safeguard may be used in economic ways, forest reserves have been created and will continue to be set apart.

"There have now been established sixteen forest reserves on the four main islands of the group with a total area of 444,116 acres. Of this sixty-one per cent. is Government land. It is probable that the creation of forest reserves will go on until eventually about three-fourths of a million acres will be so included, and these forests should be maintained and kept intact so that the water from their streams may be turned constantly to human account.

"At this point I may say that the relation of the forests to the streams is essentially the feature of Hawaiian forestry and that wherever there are streams, the forests should be protected. In some of the leeward districts there are forests which may be treated from a commercial standpoint, because in those localities there are no running streams and only a few springs to be conserved. But far and away the most important use of the Hawaiian forest is that it protects the streams. Wherever there is a water which may be turned to account this is the chief value of the forest. * * * The Federal Government, through the Forest Service, has this year given the sum of $2,000 for experimental work in planting pines, spruces, and firs at high elevations on Mauna Kea and Haleakala. Inclosures are now being made in which experimental lots of these trees will be set out. This is a step that should lead in time to the afforestation of those mountains.

"The relation of forests, waters, and lands is of peculiar importance and interest in Hawaii. These three natural resources are interdependent. The essential need at the present time is for the careful study and investigation of the local water problems by trained men—the experts of the United States Geological Survey at Washington—as a preliminary step to the extension to Hawaii of the Reclamation Service."

Dr. Jared G. Smith said:

"The actual amount of water that falls in that Kona forest—and that forest is on the dry side of the island—amounts in the course of a year to 400,000 billion gallons of water, an amount that is absolutely beyond comprehension. And yet no effort has been made to conserve that water. We have just had a drought affecting the whole dry side of the Island of Hawaii. We had to buy water, but during years past and for all time there has been this enormous quantity of water that could have been, much of it, conserved for the benefit of agriculture, not only in the Kona district, but elsewhere on the island. Not one per cent., I think not one-tenth of one per cent., of the water supplied by the rainfall is now preserved for use by the plantations or by the farmers. It is a money proposition; it is a business proposition. * * *

"Without the forest to retard the run-off, there follows flood and destruction. We have all of us seen the ocean reddened for miles from the land with the surface soils from our cultivated fields. We have seen fields, the entire surface, swept into the ocean. This loss is not simply a loss to the individual plantation or the individual farmer affected, but it is a loss to the territory—it is taking away from the natural resources of the territory some of its capital. Besides the actual conservation of water, in order that we may use it, besides the actual preservation of forest in order that we may use it, and besides, well, besides both these, we must conserve both the forest and the water in order to save our soils. Water is necessary for the growth of plants, it is necessary for our domestic stock. If any one of us discovers that he has a hole in his money pocket, he mends it; it seems to me that the territory has a hole in its money pocket, and the legislature should see that there is a hole there and try to stop it, in order that loss of actual property resources shall no longer continue."

Judge Sanford B. Dole said:

"It is, I believe, ascertained that the air from forests is cooler than the air from lands devoid of vegetation, and this is one reason why clouds appear above forests and not over surrounding regions that are devoid of vegetation and where the air above them is saturated, is full of moisture; the cooling air is more likely to produce showers than the air from other regions which are bare of vegetation. It may be said, perhaps more correctly, not that forests create showers or produce them, but rather that they allow the showers to come down. * * *

"I say that the question of the protection of rainfall is something to be considered in view of the interests of the small landholders; that if possible the droughts which sometimes occur and drive them away from their homes, which make water an article to be supplied by the quart for drinking purposes and sometimes not obtainable even then, should be lessened—that the conservation of forests there in that region reaching from North to South Kona, Kau and in the Puna district, is something to be considered from the standpoint of the small landowner. The same condition exists in

Kula on Maui. It was a terrible hardship to those people last year to have to leave their homes because they had no water and had to drive their live stock miles away every other day to get water to keep them alive. In Kau the ground was strewn with cattle which had starved to death for want of grass and water."

Protecting Water Supplies

Says the *Cleveland* (Ohio) *Plain Dealer:*

"While a few theorists—and increasingly few—still argue against the prevalent notion that an intimate relationship exists between forests and stream flow, it is noticeable that those who have the responsibility of conserving water supplies adopt the general and the sensible view. Those on whom the responsibility rests to supply the cities with an unfailing supply of water display no doubt that the existence of forests about the sources of streams tends to regulate their flow and insure their stability.

"The State Forester of Massachusetts recently made a report, discussing in a comprehensive manner the large question of forest influence on water supply, a subject of live interest to many municipalities in that commonwealth. He proposes a program of reforestation for the protection of the watershed near Fall River, which is applicable in a general way to other communities in that and other states.

"There is evidence here and there of an intention on the part of various states to cooperate with the National Government in the conservation of natural resources. Is it not possible that municipalities will find it to their interests to join in the same movement in order to protect their sources of water supply?

"The importance of an adequate and reliable supply of pure water is paramount in every city. Those which must depend on streams or upon artificial or natural reservoirs will find it increasingly difficult to protect and insure their supplies unless some progressive policy of conservation is followed."

Good Work by the Pennsylvania Railroad

The Pennsylvania Railroad is planning to set out this spring more than 1,000,000 trees. This will make a total of 3,430,000 trees which have been planted in the last three years to provide for some of the company's future requirements in timber and cross-ties. This constitutes the largest forestry plan yet undertaken by any private corporation.

Heretofore the company's forestry operations have been confined to a limited area between Philadelphia and Altoona. This year, however, 65,000 trees are being set out on tracts of land near Metuchen and New Brunswick, N. J. In addition, there are to be planted within the next month 207,000 trees near Conewago, Pa., 186,000 in the vicinity of Van Dyke, 334,000 at Lewistown Junction, 7,000 at Pomeroy, and 205,000 at Denholm.

The bare places in the locust-tree plantations, which were started some years ago, are being filled in with new seedlings, in order that these may follow as a second growth after the older trees have been removed for fence posts and other purposes. Of the trees that are to be set out this spring, 893,000 are red oak, 40,000 Scotch pine, 29,000 locust, 14,000 hardy catalpa, 14,000 pin oak, 5,000 European larch, 3,000 chestnut, 3,000 yellow poplar, 2,000 black walnut, and 1,000 white pine.

The policy of encouraging reforestation on the part of the public has been actively pursued this spring. Some 151,000 trees have been furnished, practically at cost, to private corporations and individuals. In addition, 8,000 privet hedge plants have been supplied to private individuals. Privet hedge plants to the number of 7,000 are to be set out to ornament boundary lines along the company's right of way.

A special effort has been directed this season to growing ornamental shrubbery for use in parking the lawns around stations and unoccupied spaces along the roadway. To save the time required to grow these from seed, 6,000 plants have been imported from France. They will be placed in beds, at the company's nursery at Morrisville, N. J. Part of them will be ready for transplanting next year, and the remainder in 1911.

Indicative of the scope of the forestry plan of the company this year is the fact that at the Morrisville nursery alone, approximately 1,250,000 trees have been dug, bundled, and shipped to places along the railroad. The area occupied by these trees has been plowed, fertilized, and is to be replanted with about 200 bushels of acorns. Half a million coniferous seedlings, which were grown last year, are being set in transplant beds to remain for a year before being set out permanently. In addition to the above, there will be planted this spring about 100 pounds of pine and spruce tree seed, which should produce about a million plants. These in time will be transplanted in permanent locations.

Growth of the Forest Service

In a display paragraph on its front page, *The Prairie Farmer* of May 1, publishes the following:

"Gifford Pinchot was made chief of the Division of Forestry during the Spanish-American War. At that time the division was composed of eleven persons, six of whom were clerks and five scientists. Some idea of the growth of the Forest Service, as it had later come to be known, is apparent when it

is understood that over 400 persons are now in the work of the bureau. A dozen years ago almost nothing was known about forestry in this country. During the past few years Mr. Pinchot has attained a world-wide reputation on account of his work in developing the Forest Service. Probably no factor has contributed more to the success of this work than Mr. Pinchot's attitude in getting close to the soil, and doubtless no item of his policy has brought greater practical results than his practical assistance for forest owners. Mr. Pinchot's career is an excellent illustration of what a man of independent wealth may accomplish when he devotes his life along lines for the betterment of the public."

Mr. Pinchot at Delta

In the course of his recent western trip Mr. Gifford Pinchot visited Delta, Colo. At his meeting the Opera House was packed to the doors. The *Delta Independent* said:

"But very little opposition has ever developed on the western slope to the forestry system, and in Delta and Montrose counties there doesn't seem to be any at all. The stock interests here appear to be a unit in its favor, hence the head of the Service found himself entirely among friends."

In the course of his remarks, as reported in the Delta papers, Mr. Pinchot said:

"The Service is for the public good instead of private gain and to provide more homes for our people.

"The forest policy is both democratic and republican and fights special privilege for public good.

"It is probable that our coal measures will be exhausted by the middle of the next century. Our iron ore will be gone in forty years and our supply of oil and gas in about the same time.

"At the inauguration of the Forest Service we found that there was great waste of our resources going on. As an illustration ninety per cent. of our water, which is so much needed in the arid sections, was going to waste. By the middle of the century 150,000,000 of our own people will have to be fed from our own soil and no good citizen will deny that the people should apply the same rules to the government of the nation that one would to his family, and that nothing be wasted.

"Monopoly is the opposite of conservation. Foresight is necessary to success. Conservation means the ordinary business principles applied to government.

"The forest areas are great and evils creep into the Service, but with the cooperation of local people we can succeed in our work. We have endeavored to ascertain where wrongs have been done so that we might remedy them. Complaints have been of two classes: From those who could not get what they should have, and from those who wanted what they should not have. To the latter we have no apologies to make. This Service stands for the small man—the home-maker. Prospectors may enter the reserves for legitimate work, but we do not intend to allow persons to take up land, under the guise of mining, for some other purpose.

"We are pushing out the work of the Service from Washington to the various district offices, to those on the ground, and we believe that the men in the districts are good men. Before leaving Washington I saw President Taft and he said to tell the people out in Colorado that the administration is back of the Forest Service and is trying to work with the people of the West for their own best good.

"If, by mistake, injustice has been done to any man, it will be corrected, so far as I have the power.

"The general forest policy has been established, and it will move along under the new administration as under the old.

"I do not believe the change in presidents will have any effect on the forest policy; I have seen no signs of it.

"Of the total amount received from those who received direct benefits from the use of the varied resources of the National Forests of Colorado last year, twenty-five per cent., or $59,761.28, was turned over to the state to be used in the development and maintenance of roads and the public-school system.

"The Forest Service exists not only to protect the National Forests. It exists just as much to develop the Nation and the states in which they lie, and it has no stronger desire than to promote and foster the development of Colorado and every other western state. No more complete mistake about the National Forests has ever been spread abroad than that they are shut against development and use."

Mr. Pinchot was listened to with the utmost attention, and at the conclusion of his address he was heartily applauded.

Other speakers, including Hon. Frank C. Goudy, John C. Bell, M. D. Vincent, and Judge A. R. King, also spoke.

To Examine National Forest Boundaries

The Forest Service plans a thoroughgoing examination of National Forest boundaries and an inquiry into the character of any inferior areas which may appear to be unsuited for National Forest purposes. Special effort will be made to exclude from the National Forests land better suited for agriculture than for forest purposes.

Withdrawal of Public Lands

The Secretary of the Interior has temporarily withdrawn from any form of disposition whatever under the public-land laws the following tracts of land:

Ten thousand two hundred and forty acres lying in Tps. 20 and 21 S., R. 28 E., Willamette Principal Meridian, for the Emigrant Creek Reservoir in connection with the Harney Project, Oregon.

Under the Dechutes Project, Oregon, Willamette Principal Meridian: Sixteen thousand six hundred and forty acres in T. 24 S., R. 6 E., for Crescent Lake Reservoir; T. 23 S., R. 6 E., all of unsurveyed township, for Odell Lake Reservoir; 23,040 acres in T. 25 S., Rs. 6 and 7 E., for Big Marsh Reservoir.

Senate Committee to Visit Irrigation Projects

United States Senator Thomas H. Carter of Montana, chairman of the Senate Committee on Irrigation and Reclamation of Arid Lands, advises R. Insinger, chairman of the Board of Control of the National Irrigation Congress, that he will attend one or more days at the seventeenth session in Spokane, August 9 to 14, but he does not believe the committee will be able to be present in a body. He adds:

"The committee will start on a tour of inspection of the various reclamation projects of the Government about September 1, accompanied by the Secretary of the Interior and the Director and Chief Engineer of the Reclamation Service."

The committee, which is composed of thirteen Senators, will visit the projects in Kansas, Nebraska, North and South Dakota, Montana, Wyoming, Colorado, Idaho, Washington, Oregon, Nevada, Utah and California, passing one or more days in every community to familiarize itself with what has been accomplished under the Federal Reclamation Act, and to ascertain if any changes are required in the statute to make it more effective.

Irrigation in Washington

More than 100,000 acres of land, exclusive of Government projects, will be added to the irrigated area in eastern and north central Washington this year, and arrangements are also under way to put water on thousands of acres of land in northern Idaho and Oregon, western Montana and southeastern British Columbia. As most of these lands will be devoted to apples, peaches, pears, and plums, it is estimated that from 7,000,000 to 10,000,000 trees will be planted during the next fourteen months, giving employment to hundreds of men in various parts of the Inland Empire this spring, next fall and the spring of 1910.

Reports are also current in Spokane that the Federal Government will take up the Benton and Kittitas projects, 877,800 acres, in Yakima, Klickitat, and Benton counties, already reported upon by the Reclamation Service, and it is believed that the Palouse projects, 100,000 acres, abandoned by the Reclamation Service because of the lack of funds, will receive attention this year. Other government works in Washington to be taken up include 50,000 acres in the Ellensburg district, 200,000 acres in the Rattlesnake and Coal Creek districts, and 10,000 acres in the Okanogan country.

The Government will in time have reclaimed 1,500,000 acres of wholly or partly waste lands in the state of Washington at an estimated cost of $50,000,000, which is prorated among the owners of the land where water is used. The projects in operation and under construction by the Reclamation Service include these works in the Yakima Valley: Sunnyside, 90,000 acres, to cost $1,600,000; the Tieton, 30,000 acres, costing $1,500,000, and the Wapato, 120,000 acres, to be completed at a cost of $1,500,000.

The National Irrigation Congress at Spokane

Prepartions for the National Irrigation Congress, in Spokane, August 9 to 14, are being vigorously pushed. Mr. R. Insinger, chairman of the board of control, is the leading promoter. Governors Shallenberger of Nebraska, Campbell of Texas, Spry of Utah, and Ansell of South Carolina have named delegates, as have also Mayor Crittenden of Kansas City, Mo., and Mayor Fugard of Pueblo. The latter city expects to send a special train or two and capture the Congress for 1910. Senator Jonathan P. Dolliver, of Iowa, chairman of the Committee on Agriculture and Forestry, who is planning an extended trip throughout the Pacific Northwest, announces that he hopes to attend the congress.

Senator Dolliver is deeply interested in the problems pertaining to agriculture and forestry, also questions of deep waterways, drainage, good roads, and home-building, all of which questions will be discussed by experts, including statesmen, scientists, railroad presidents, and financiers.

Dr. J. G. Schurman, President of Cornell University, announces the appointment of Prof. Liberty Hyde Bailey, director of the College of Agriculture at Cornell, as the representative of that institution. Professor Bailey was head of President Roosevelt's farm-life commission and, as such, toured the Inland Empire and Pacific Northwest last fall, acquiring familiarity with western conditions, including irrigation, forestry, waterways, swamps, reclamation and the like.

August 13 has been fixed upon as Governors' Day, when chief executives of the northwestern states and others of the East and South, will be present at the invitation of Gov. Marion E. Hay, of the state of Washington. President Taft and several members of his Cabinet are expected, and

accredited delegates from various parts of the world to the number of 4,500 or 5,000 are expected.

Mr. Pinchot to Attend National Irrigation Congress

Mr. Gifford Pinchot, Chief of the Forest Service, who will be one of the speakers at the sessions, writes to Mr. Insinger that he will be at the congress from start to finish. Mr. Pinchot also probably will visit a number of places in the Northwest following the sessions in Spokane. It is expected he will be accompanied by several officers of the Service on his western trip.

Competition for Next Irrigation Congress

Competitors are multiplying for the next irrigation congress. E. W. Palmer, secretary of the Pueblo Business Men's Association, writes to Mr. Hooker that a strong effort will be made to secure the 1910 congress for his city. Chicago, the great convention city, will also press its claim as a logical center for the next congress. Advices have been received that a special train of boosters will come from that city to Spokane with the endorsement of the Chicago Association of Commerce and officials of railroads. It is also known that the South will make a strong bid for the congress, the most persistent contender being Charleston, S. C. A report is also in circulation that two other cities are planning to invite the Congress to meet in the middle West.

Land and Irrigation Exposition

A movement has been started to hold a United Land and Irrigation Exposition at the Coliseum in Chicago beginning November 26, coincident with the opening of the International Live Stock Exposition. Railroad and land interests in Chicago are back of the movement. To the *Chicago Tribune*, as a disinterested party, has been delegated the financial and executive responsibility for this exposition.

The purposes of the United States Land and Irrigation Exposition, as pointed out by Secretary Robert P. Cross, "are to illustrate to prospective settlers methods of cultivation, and to show what can be produced on lands now under irrigation, on lands on which crops may be successfully raised by 'dry farming,' and on lands still undeveloped where rainfall is bounteous."

"The United States Land and Irrigation Exposition, as proposed," says the *Prairie Farmer*, "is deserving of full and hearty support and will doubtless meet with the hearty sympathy of all who are interested in developing and conserving the national resources."

Nebraska No Longer "Wild"

A breezy reporter for a Chicago newspaper wrote of "brushing by the wilds of Nebraska," and referred again to "the forlorn wastes" of that state. In an interesting pamphlet, the *Twentieth Century Farmer* calls him down. Following are a few extracts relative to the alleged "wilds" and "wastes:"

"'The forlorn wastes of Nebraska,' wrote the *Record-Herald's* corresponident. 'Forlorn wastes' that produced 178,000,000 bushels of corn, 56,000,000 bushels of oats, 43,000,000 bushels of wheat, 8,000,000 bushels of potatoes, 2,000,000 tons of alfalfa, $50,000,000 worth of cattle and $12,000,000 worth of hogs in 1908! 'Forlorn wastes' that sell for from $75 to $350 an acre. 'Wilds of Nebraska'—and Nebraska with 7,000 school buildings, $8,000,000 in the permanent school fund and $27,000,000 worth of school lands pouring more millions into that fund every decade!

"'Barren wastes' from which ascends the smoke from manufacturing plants that have a capitalization of $50,000,000, employ 20,000 wage-earners and pay $10,000,000 a year in wages while turning out finished products worth $175,000,000 on the open market!

"There is more of pauperism, human suffering and abject misery in one ward in the city of Chicago than there is in the whole state of Nebraska. In the 'wilds of Nebraska' there are school houses with room enough therein to accommodate every Nebraska child of school age, and on Nebraska's 'barren wastes' is raised enough of wholesome food to give every child a breakfast before he goes to school and put a full dinner pail in his hand when he starts. On these 'barren wastes' we have erected and maintain the fourth largest state university in the Union and two of the largest normal schools in the country. On these 'barren wastes' 897,000 milch cows, worth an average of $31 a head, are converting nutritious Nebraska grasses into $7,000,000 worth of butter and cheese, and the happy wives and daughters of farmers are seeking the nests of the industrious Nebraska hen and collecting $18,000,000 worth of eggs.

"'While traveling in the wilds of Nebraska' and 'gazing over the forlorn wastes of Nebraska' the *Record-Herald* reporter missed a whole lot. For each man, woman and child in Nebraska there is an average of $159 deposited in the banks of the state. For each child of school age the state expends $27 a year in educational work and for each enrolled pupil an average of $30 a year."

Investment in Water Transportation

"Within a few months a new thirty-five-foot channel will connect the lower Mississippi with the Gulf of Mexico. This is only one of the numerous developments in the way of transportation by water. Projects are already under way which mean an investment of hundreds of millions of dollars in the course of probably no more than ten years. Among them is the work on the New York State canal system, involving the expenditure of $101,000,000 of public funds. Several millions more will be required for the canal terminals made necessary by this method of navigation.

"The Business Men's League of St. Louis has already enlisted some millions of dollars in the effort to restore the Missouri and Mississippi river traffic, with terminals at St. Louis, at Kansas City, and at New Orleans. Two new coastwise steamship lines will within a month or more be operating between Philadelphia and the Gulf. On the Pacific coast the development of Mexican and American trade relations is adding to the shipping there, including the Hill line connecting the north coast terminals with San Francisco.

"The impulse to internal navigation and to coastwise commerce is manifested further in Congressman Ransdell's bill to organize a department of transportation, in the advocacy of the issue of $50,000,000 of United States bonds for the improvement of canals and interior streams, and in the survey of the project for a coastal canal extending from Boston harbor to Galveston.

"No threat to our railroad development as a whole is implied. Such water facilities, in fact, have usually brought more new business to the railroads than they have taken away."—*Wall Street Journal.*

"Kansas City is raising a million dollars to get a boat line on the Missouri River, 1,500 miles from blue water. New York State is spending $101,000,000 improving the Erie Canal. Canada is spending $100,000,000 making a canal from Lake Huron to the St. Lawrence River, and the state of Illinois is spending $20,000,000 to get deep water from Chicago to the Mississippi. Beaumont, by the way, will very shortly vote $400,000 to get deep water down to the Port Arthur outlet, enabling her to bring deep-sea ships up to city wharves in the Neches River."—*Houston* (Tex.) *Chronicle.*

To Reclaim Oklahoma Land

Many thousands of acres of the richest agricultural lands in Oklahoma, now uncultivated, are to be reclaimed and made permanently useful under a law of the first legislature that permits counties and communities to cooperate with the Federal Government in the drainage of swamp and overflow lands. Throughout almost the entire course of the Deep Fork and Little River, and for long stretches along the North Canadian and Washita, are large areas of land that are either swamp or subject several times a year to inundation. The soil is as rich as may be found, of great depth, and capable of producing heavy crops for an indefinite period. The reclamation of these lands will be a source of wealth to their owners.

Since January 1 surveyors and Federal engineers have been at work in Johnston County preparing for the drainage of 5,995 acres of land contiguous to Sandy Creek. About eight miles of canals, and a number of levees will be built, at a cost of $30,000, which will be charged against the land in proportion to the benefits derived.

Work on the Washita bottom lands in Marshall and Johnston counties will begin as soon as the Federal Government makes a complete survey of the Washita River from the upper edge of Garvin County to the mouth of the river, giving an estimate of the cost of the drainage of the entire river country.

Surveys are under way in Lincoln County to reclaim Deep Fork lands.

The Largest Fountain in the United States

Near the Great Falls of the Missouri in north-central Montana are some very large springs that present certain unique geologic features and suggest an interesting problem as to the source of the water. These springs, known locally as Giant Springs, were discovered in 1804 by Captain Lewis, of the Lewis and Clark expedition, who described them as the "largest fountain in the United States."

These springs, which are on the south side of Missouri River, about three miles below the town of Great Falls, Mont., issue through large joints in a medium to coarse grained sandstone on the bank of the river at the water's edge and in the bed of the river itself. The situation of the springs makes exact measurement of their flow very difficult, but the difference between two measurements of the flow of the Missouri—one above and the other below the springs—has been assumed to be the quantity of water furnished to the river by the springs. According to E. T. Nettleton, this amount is approximately 638 cubic feet a second—the equivalent of more than 400,000,000 gallons every twenty-four hours—a veritable underground river. The water, which boils up with considerable force, is clear and relatively pure, containing no more dissolved salts than the average well-water of the Great Falls region. It has a temperature of about fifty degrees Fahrenheit.

No use is made of the water at Giant Springs. The report by Mr. C. A. Fisher, published by the Geological Survey, as Water-supply Paper 221, is distributed free.

The Smoke Nuisance

The smoke plague of American cities has been conquered by science according to the statement of Federal experts who have been studying the problem for a number of years. They not only make the assertion that smoke prevention is possible, but stand ready to prove it by actual demonstration to any one sufficiently interested, and are proving it every day at the United States Geological Survey Experiment Station, at Pittsburg, Pa. In that smoky city the plant is being operated absolutely without smoke and the experts are burning a coal considered refuse by the trade, costing, delivered at the station, 88 cents a ton.

"Some may say that this can only be done at an experiment station and not at a commercially operated plant," said H. M. Wilson, chief engineer, Technologic Branch, United States Geological Survey; "but the investigation conducted by the Government leads to a different belief. Employees of the Survey visited industrial establishments in the larger cities of Illinois, Indiana, Kentucky, Maryland, Michigan, Missouri, New York, Ohio, and Pennsylvania and found more than 200 plants being operated without smoke and with a gain in economy, for smoke these days means waste.

"The investigation indicates that the clean, comfortable American city with a normal amount of sunshine is not far off. Smokeless cities only await a quickened public conscience to the fact that this nuisance means uncleanliness, poverty, wretchedness, disease, and death. The public has only to realize that smoke in the cities costs in merchandise in stores and warehouses, more than $600,000,000 a year. This loss in money is based on the statement of the Chicago smoke inspector that his city suffers a loss each year of $50,000,000. More than a third of the people of this country live in the great and moderate-sized cities."

The Geological Survey has been endeavoring by experiments for several years to increase the efficiency with which the fuels of the country are being used and this led to a study of the smoke problem, for smoke is waste due to imperfect combustion. The statement is now made that in fifty per cent. of the industrial plants of the United States, more than ten per cent. of the coal bill can be saved each year by the smokeless burning of coal and five per cent. in the other plants. This would amount to several million dollars.

The experts who had immediate charge of this investigation were D. T. Randall and H. W. Weeks, engineers of the Technologic Branch of the Survey, and they have just made their report which will soon be issued by the Geological Survey as a bulletin. Mr. Randall maintains that it is not necessary to use any one certain patented furnace to obtain smokeless conditions. Many types of furnaces and stokers burn coal without smoke.

"Credit is to be given to any one kind of apparatus only in so far as the manufacturers require that it shall be so set under the boilers that the principles of combustion are respected," says Mr. Randall. "Stokers or furnaces must be set so that the combustion is complete before the gases strike the heating surface of the boiler. When partly burned gases at a temperature of, say 2,500 degrees Fahrenheit strike the tubes of a boiler at, say, 350 degrees Fahrenheit, combustion is necessarily hindered and may be entirely arrested. The length of time required for the gases to pass from the coal to the heating surface probably averages considerably less than a second, a fact which shows that the gases and air must be immediately mixed when large volumes of gas are distilled, as at times of hand firing, or the gas must be distilled uniformly, as in a mechanical stoker.

"The fireman is so variable a factor that the ultimate solution of the problem depends upon the mechanical stoker—in other words, the personal element must be eliminated."

Maine's Peat Bogs

The United States Geological Survey, in Bulletin 376, reports the results of an investigation of the peat bogs of Maine.

"The field tests and analyses recorded in this report show that Maine posessses immense resources of peat of excellent quality for fuel and other purposes. In the southern and eastern parts of the state deposits of good quality are most abundant in Androscoggin, Kennebec and Penobscot Counties, and especially in Washington County. In the northern part of the state tests were made only in Aroostook County along the Bangor and Aroostook Railroad. Peat resources as great as or greater than those of southern Maine undoubtedly are to be found in the forested lake districts of the northern part of the state. There utilization is so remote that testing them for the purpose of the report was not warranted, but they must be considered in estimating the total peat resources of the state. These resources, except for experimental plants near Lewiston and Portland, are at present undeveloped.

The area of peat land actually tested in preparing the report is estimated at twenty-five square miles. The average depth of the peat is about ten feet. It is calculated that the bogs tested are capable of yielding at least 34,000,000 short tons of air-dried machine peat which, at $3 a ton, would represent a value of more than $100,000,000. It is probable that the deposits tested form only one-tenth to one-fifth of the total peat resources of the state."

The bulletin 376 may be obtained free from the Director of the U. S. Geological Survey, Washington, D. C.

To Save Miners' Lives

Four stations for the training of miners in rescue work have been established recently by the big coal companies of the country and several more are in contemplation. This is a direct outcome of the demonstrations in rescue work being made by the United States Geological Survey, Technologic Branch, at its experiment station in Pittsburg, Pa., and at the subrescue station in Urbana, Ill.

"The fact that these stations have been established is gratifying to the Geological Survey," said Director George Otis Smith "It shows the operators and mine owners are taking interest in this humane movement, and it is bound to result in a decrease in the number of deaths in the mines. The sole purpose of the Government in taking up this work was to demonstrate its usefulness. It is not the intention to make the rescue station work permanent.

"Perhaps the most complete of these private stations is that of the Frick Coke Company, which employs 30,000 men. The station has been erected at the Leisingring mine, near Connellsville, Pa., in easy reach of all the Frick company's mines. There is a corps of six men being trained in the use of the oxygen helmet, a device that admits artificial breathing for two hours in the most deadly gases known. In order that the men be given practical experience in the use of these helmets, a part of the station has been devoted to an air-tight room which is filled with gases that will not support life. The men are being given a daily drill in this gas-filled room and are gaining confidence in the use of the helmets. Within a short time, the corps will visit the Government experiment station at Pittsburg, where the members will be given further instructions by the Federal experts.

"Whenever a disaster occurs in any of the Frick company's mines, the rescue corps will respond at once and will immediately enter the mine for the purpose of bringing to the surface miners who have been injured or are unconscious from the effects of gases. With these helmets, the rescuers can enter any gas-filled mine where it would be sure death for the miner to go. In many disasters the men fortunate enough to be outside of the mine when the explosion occurred have had to remain at the surface for hours, waiting for the ventilation to drive the gases out, knowing all the time that their comrades were dying."

Other rescue stations have been established at Fairmont, W. Va., at the Marianna mine in Pennsylvania, where 150 lives were lost last November, and at Zeigler, Ill.

Mr. J. W. Paul, who has charge of the rescue work for the Government, left Washington recently for Europe, where he will study rescue work at the European stations. "In the short time we have been operating we have saved the lives of six men," said Mr. Paul, "and if we did nothing more, the results would warrant everything that has been done so far by the United States in trying to reduce the accident death rate in the mines. But I am satisfied more good will come from our efforts. The four stations just established will be the means of saving the lives of many miners; and we all know, many a poor fellow, imprisoned in a mine filled with the dread fire-damp, has lived in agony for hours before he died. I understand that the operators are to establish many more stations."

Mississippi's Rank in Naval Stores Production

Mississippi held fourth place among the states figuring in the naval stores industry last year, outranking Louisiana, North Carolina, South Carolina, and Texas. The three leading states were Florida, Georgia, and Alabama. The states making the most marked advances in the production of naval stores last year were those using improved methods in turpentining, and it is safe to predict an even better showing in Mississippi when the cup and gutter and the cup and apron systems are used more widely.

The production of more than 36,500,000 gallons of turpentine and more than 4,000,000 barrels of rosin, with a valuation of more than $14,000,000 for the turpentine and nearly $18,000,000 for the rosin, summarizes the output of the naval stores industry for all states in 1908, according to the preliminary report of the United States Forest Service just completed. The study was provided for in a special appropriation of $10,000 by Congress and the report contains the most complete and accurate statistics ever gathered for the naval stores industry in this country and covers the production for both 1907 and 1908, giving comparative figures for the two years.

Of the eight southern states, each producing more than 200,000 gallons of turpentine and 25,000 barrels of rosin, Florida leads the list with 17,030,300 gallons of turpentine in 1908 against 15,572,700 gallons in 1907, and 1,932,114 barrels of rosin in 1908, against 1,774,370 barrels in 1907.

Georgia, Alabama, Mississippi, Louisiana, North Carolina, South Carolina, and Texas follow in the order named. The comparative report of the production by states is as follows:

	1908		1907	
	Turpentine gallons	Rosin barrels	Turpentine gallons	Rosin barrels
Florida....	17,030,300	1,932,114	15,572,700	1,774,370
Georgia....	10,347,800	1,203,059	10,119,500	1,173,575
Alabama..	3,744,050	446,909	3,544,300	418,496
Mississippi	2,277,850	277,704	2,232,500	255,307
Louisiana..	1,696,250	195,804	1,134,100	126,346
N. Carolina	732,300	131,907	916,400	168,561
S. Carolina	559,800	72,125	586,950	75,057
Texas.....	200,650	28,661	74,350	7,609
	36,589,000	4,288,283	34,180,800	3,999,321

While these figures show an increase of 2,408,200 gallons of turpentine and 288,962 barrels of rosin for 1908 over 1907, there was a marked decrease in the value of the product for 1908 as compared with the preceding year. This was due to the great decrease in the prevailing prices for turpentine for 1908 and the slight decrease in the prevailing prices for rosin during the same year. The value of the product for the two years follows:

Turpentine, 1908, $14,112,377.32; 1907, $18,283,309.93; rosin, 1908, $17,783,509.61; 1907, $17,317,059.93; a difference in the value of the combined output of $3,704,482.93 in favor of 1907.

The increase in production for 1908 over 1907 was due more to favorable weather and labor conditions than to increased operations. But few operators increased their operations, owing to the disorganized condition of the market at the time operations commenced. Figures upon which the report of production for the two years is based were secured by a system of correspondence and personal visits to the points of production by agents of the Forest Service.

To Create Municipal Forests

A forward step of vast significance in the utilization of forest lands adjacent to cities in Pennsylvania has been taken by the passage of a bill entitled "An act to permit the acquisition of forest or other suitable lands by municipalities for the purpose of establishing municipal forests and providing for the administration, maintenance, protection and development of such forests."

The bill, as presented, is at the suggestion of the American Civic Association, which has made the subject of the preservation of forests one of its great activities. Legislation of the character contemplated by the Pennsylvania bill is new to the United States, but not new to European countries, Germany in particular. Municipal forests in that country have been acquired and developed during a period of many years. They have been more than an addition to park systems—they have been a source of revenue to the municipalities maintaining them. The same results would be accomplished by the application of the municipal forest idea in America. The extent to which Germany has recognized the value of its forests is illustrated by the fact that in the single province of Baden, of its 1,564 communities, 1,350 own their own forests and in addition 287 corporations, such as schools, churches, and hospitals, possess forest land. From an aggregate of 1,342,944 acres in the state these local corporations are allowed to cut yearly 261,724,300 board-feet of timber and wood, with a net value of about $3,600,000. The city of Baden alone owns 10,576 acres, from which it has derived a net income of $66,079.68, or $6.25 per acre, all of which goes to the general fund for the maintenance of the municipality.

The Pennsylvania law makes possible similar returns for its townships, boroughs, and cities, the control of the forests thus acquired to be directed by the commissioner of forestry of the commonwealth. What Germany can do the United States ought to equal and exceed, notwithstanding the fact that Berlin is proposing at the present time to expend $10,000,000 in the acquirement of forests.

Of this law Dr. J. T. Rothrock, Consulting Forester for Pennsylvania, says: "I regard it as one of the most important forestry measures that we have secured in this state. It cannot fail of good results. We are indebted to the President of the American Civic Association, more than to any other one man, for its introduction and passage. It involves no expenditure of state funds and there is no reason why it should not lead to like enactments in every other state, and every reason why it should."

Saving Storm-felled Trees from Borers

Experts of the Department of Agriculture have been studying the work of insects in storm-felled pine in the South, especially the work of the borer known to lumbermen as the "sawyer." The results should be of immediate interest to owners of timber felled or damaged by recent storms in the Southern States.

It has been found that the sawyer begins work in the bark of felled trees very promptly, and that it reduces the value of the timber about one-third within two months, a reduction which represents many millions of dollars annually.

This loss may be largely prevented by prompt action on the part of the timber owners. As soon as possible after a destructive storm an estimate should be made of the amount of felled timber that can be converted into lumber before the sawyers begin to enter the wood. Trees that cannot be worked up with little delay can be protected in either of two ways: (1) The bark may be removed from the trunks, or (2) the logs may be cut without removing the bark and placed in streams or ponds. The sawyers will do practically no damage to timber from which the bark is removed within a month after their attack begins. In case of logs placed in water, they will continue their work only in the parts which are not completely submerged.

To timber felled in winter or early spring the methods recommended should be applied by May 1 for best results. Timber felled during the summer should be worked up, or have the bark removed, or be placed in water within one month after the sawyers begin to work in the bark.

Consumption of Pulp Wood in the United States

The Census Bureau issued on May 15 a preliminary report on the consumption of pulp wood in the United States during the calendar year ending December 31, 1908. In it is found the following table:

Kinds of wood	1908 Quantity, cords	1908 Cost	1907 Quantity, cords	1907 Cost
Total	3,346,106	$28,040,697	3,962,660	$32,360,276
Spruce, domestic	1,487,356	13,024,104	1,795,278	15,358,027
Spruce, imported	672,483	7,130,457	905,575	8,689,159
Hemlock	569,173	3,423,789	576,154	3,270,700
Poplar, domestic	279,136	2,235,448	352,142	2,763,889
Poplar, imported	23,081	184,326	19,798	167,039
Pine	84,189	512,013	78,583	506,517
Cottonwood	45,679	324,053	66,084	469,422
Balsam	45,309	327,624	43,884	332,984
Miscellaneous	139,700	878,883	125,162	802,539

Japan Fights Paper Famine

The Japanese also have looked over the contents of their industrial stores and have decided that something must be done toward conserving their remaining supplies of raw material for paper-making.

In Japan, paper is used for almost everything from the silver-figured partitions of the Buddhist temple to the rude hut walls of the laborer; from the silklike vestments of the priest down to the rainproof shield of the traveler. In fact, the ingenuity of the Japanese is only matched by the variety of uses to which paper may be adapted.

The work of the United States Government toward determining the amount of paper materials used and the source of future supply is being followed by the Japanese, according to an advice from U. S. Consul John H. Snodgrass, at Kobe. The imminence of the danger is apparent from the fact that the Japanese authorities have requested the paper-mills department of the Mitsu Bishi Kaisha to take over some 7,500 acres of the bamboo forests of Formosa.

It is known that the bamboo tree has been the raw material from which the Japanese have recently made the larger portion of their paper products; so it is thought that, by introducing improved methods of forest cultivation and harvesting, this tract of woods will furnish yearly 10,000,000 bamboos adapted for conversion into paper pulp.

No matter whether the paper company will establish its mills in Formosa or ship the bamboo to Japan in a partly finished state, the development of this new source of raw material will be of high importance and may overcome the necessity of the island empire looking to foreign countries for the future supply of paper pulp.

Waste in Iron Menaces Race

A London dispatch to the *New York Herald* says:

"Mr. Allerton S. Cushman, assistant director of the Office of Public Roads in the United States Department of Agriculture, has been warning the iron and steel people in England against the waste that is going on in the world's natural resources. To the *Herald* correspondent Mr. Cushman expressed some very strong views on this subject. He said the increasing consumption of the world's supplies, and the constant decay of materials menaced the future of the human race. If the present insane riot of trade continued the time was not so very far distant when the members of the human race would find themselves in a very difficult situation.

"If the processes of civilization were to be carried on, it seemed quite certain that civilization must learn to conserve more efficiently its stores of iron and steel already manufactured and seek methods to prevent the almost resistless tendency of iron to return to its lethargic union with oxygen. If steel could by any means whatsoever be ennobled and protected from corrosion future conditions could be viewed with complacency.

"Probably we could not to-day, with all our boasted knowledge, build an iron monument like that at Delhi, which with no protective covering had stood since the dim beginning of history without rust or decay. It was his belief that we had started now on the right track, and that a very few years would see very decided improvement, not only in the incorrodibility of material manufactured, but also in methods of preserving iron and steel after manufacture. The waste of iron and steel also meant the waste of coal, and the whole problem of conservation of these resources was one of the most important now facing civilization."

Mr. Cushman went to London as a delegate to the International Congress of Applied Chemistry, which opened May 22.

The

Profession

of

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By

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"In closing, it should be said that, in comparison with the work remaining to be done, the work already accomplished by all the forestry forces combined is slight. Destruction of resources proceeds without abatement. Sentiment now developing should be intensified, and focused upon local, state and national governments, that legislation and administration may accomplish the ends without which all our efforts are vain.

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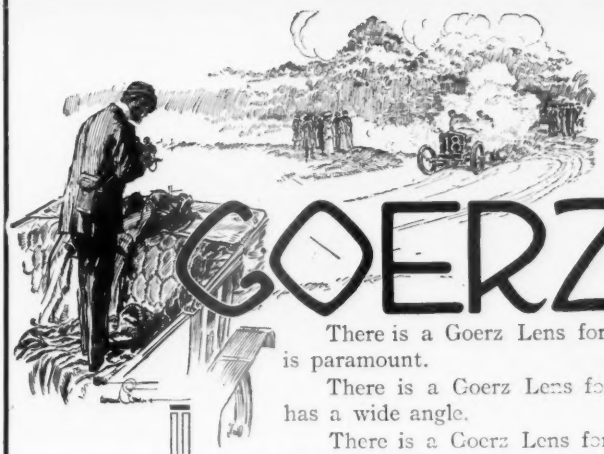

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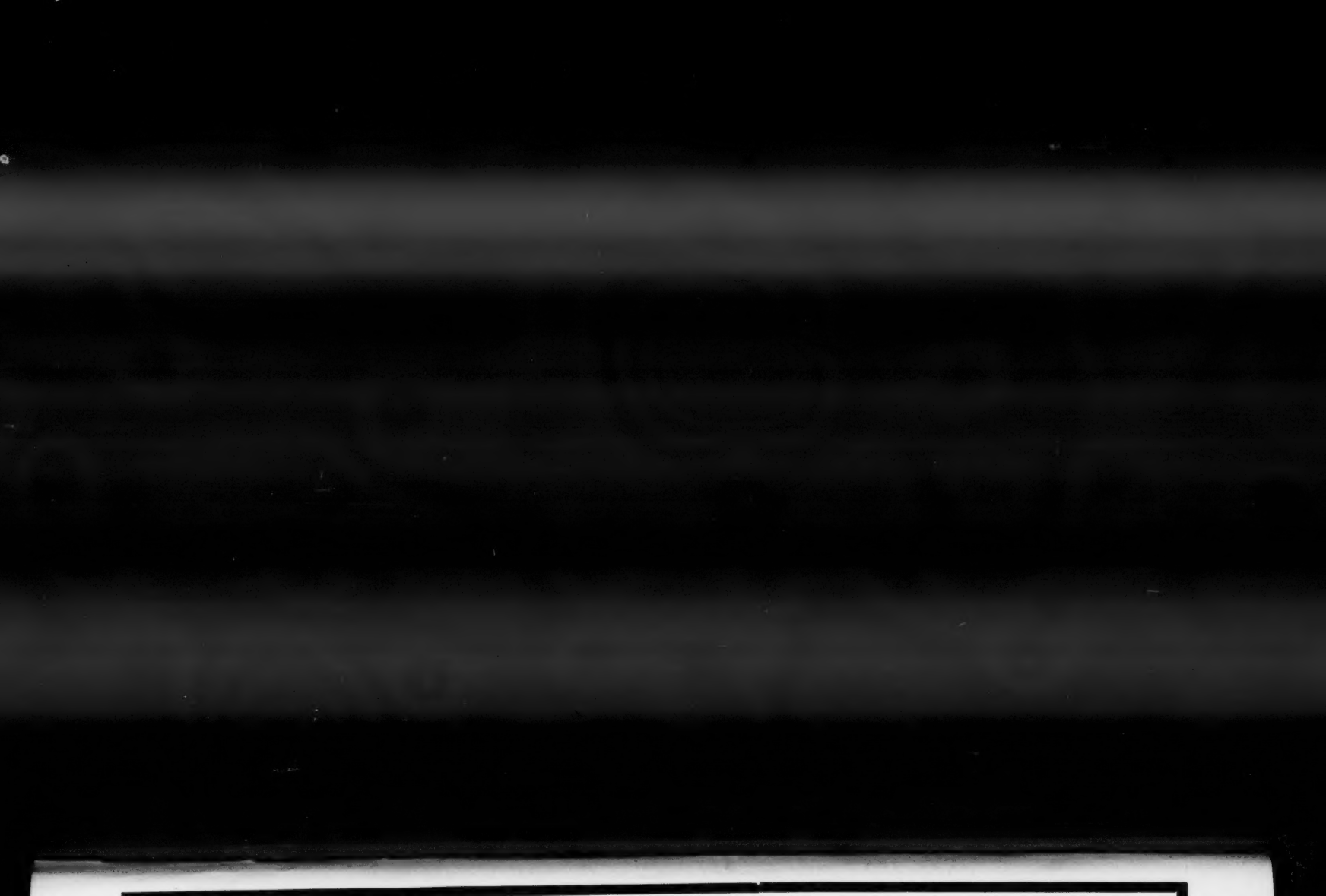
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